The Canadian Medical Association Journal

OCTOBER, 1952 • VOL. 67, NO. 4

COUGH MEDICATION AND ANTIHISTAMINIC DRUGS*

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DURING THE WINTER half of the year, cough is one of the most common and obvious evidences of disease of the respiratory tract amongst Canadians. Providing a temporary cough does not demand too much of our time, or attract too much of our attention, or try our patience too greatly, or produce too much pain and distress, it is usually ignored. The decision as to what constitutes "too much" time, attention, exasperation, pain or distress rests with the person afflicted, with or without the advice of friends or relatives. Having decided to seek relief from cough, a Canadian may purchase one of many products which are available in drug stores, or he may seek the advice of his physician. The consulted physician makes his diagnosis and prescribes therapy based upon his experience and the principles that he learned while attending medical school.

The function of a professor of pharmacology in Canadian medicals schools in this particular chain of events is to teach the basic principles involved in the therapy of cough and to outline the rational and sensible use of drugs. Such teaching is based upon a critical digest of published experiments and experience. When these sources do not provide adequate coverage of the subject, the alternatives are to await publication of further information or to undertake investigation with a view to obtaining the necessary data.

I found myself in the latter position in 1934 when I was engaged to teach pharmacology in the Faculty of Medicine at Queen's University. There was then a dearth of information upon which to base a sensible approach to several aspects of drug therapy, a situation which has in general improved greatly since that time. The vacuum of facts upon which to align a rational sequence of ideas on the therapy of cough was particularly marked in the professional medical literature of the 1930's. Narcotics of the opium group were quite obviously good antitussives but quite as obviously liable to produce a serious chronic poisoning of the brain if repeatedly used. Several textbooks, particularly those which had gone through many editions, gave what I found to be a confused account of the therapeutic use of expectorants. Authors of other textbooks, apparently as dubious of the experimental background of accounts upon antitussive therapy as I was myself, took the expedient of making little or no reference to the subject. But cough was still with us and men and women consulted their family doctor seeking relief which, if not possible from such a source, they must attempt to find elsewhere.

In an effort to establish some rational basis for antitussive therapy, a research program was started in the Department of Pharmacology at Queen's University in 1939, and the first report was published in this Journal in 1940.[5] In the present paper, I do not propose to review the work published in the intervening years, but rather to outline very briefly the principles of antitussive therapy as they appear to me in the light of these studies, with particular reference to the recent inclusion of antihistamines as adjuvant drugs. There remain to be investigated many problems upon individual antitussive and reputedly antitussive drugs and there is need for a screening program which might be expected to yield new, safe and more effective drugs of this category.

Cough is a protective reflex, available when necessary, to remove obnoxious material from the upper respiratory tract, a function similar teleologically to vomiting and the upper gastrointestinal tract. Tussal hyperreflexia may be treated, in physiological sequence, (a) by reducing the sensory stimulation through the use

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This paper is in part a synopsis of a lecture delivered before the Thursday Club of Queen's University, January 3, 1952.

of preparations such as pharyngeal demulcents, inhalations and bronchial demulcents or expectorants; (b) by depression of the reflex centres through employment of drugs such as opiates; (c) by cerebral cortical desensitization to cough through training and, at least in theory, (d) by blocking at ganglia or at myoneural junctions. The fourth approach is rare in practice but it is possibly prophetic that Hillis and Kelly of Glasgow[6] reported in 1951, that administration of hexamethonium overcame lobeline-stimulated coughing in five subjects.

Having reviewed for my students at Queen's University what is known about the cough reflex and the source, nature and functions of demulcent respiratory tract fluid, I realign the above mentioned antitussive measures into what seems to me to be the steps which should be taken in progression, one or more as may be needed, in the therapy of cough. First, many coughs due to mild temporary upper respiratory infections or irritations are best ignored. They will disappear in a few days and no drugs need be prescribed. Couch your advice in psychosomatic terms if you think that so expressed it will be more effective and more liable to be followed. Honest and sensible advice pays great dividends to your own peace of mind, a rare property these days.

In the second category I list pharyngeal demulcents and local sialogogues. Saliva and mucus are natural soothing agents to the exposed mucosa of the pharynx, irritation of which gives rise to many coughs. A candy, troche, lozenge, or cough drop, medicated or not medicated, stimulates the flow of demulcent saliva while being held or lodged in the mouth. Measures one and two, both simple and yet scientific, will take care of the majority of coughs seen in Canada.

The stimulus giving rise to cough may originate through irritation lower in the respiratory tract, in areas of the trachea, bronchi and bronchioles not reached by demulcent saliva. It may also arise more rarely in other regions of the body. The soothing mucus of the respiratory tract below the epiglottis is respiratory tract fluid, a pale yellowish or colourless fluid being constantly produced and carried upward by cilia lining the respiratory tract. My associates and I have found that many of the drugs classified as expectorants are capable of increasing the volume output of this fluid. This pharmacological reaction is readily demonstrated in many species of animals and I feel reasonably certain it must also occur in man. My associates and I have found in this department at Queen's University that most drugs which have this expectorant effect upon respiratory tract fluid act reflexly from the stomach. Notable exceptions are certain volatile oils, which seem to act directly upon the respiratory tract, and parasympathomimetic drugs which, of course, are of limited therapeutic value because of their ubiquitous pharmacology.

How effective expectorants are in augmenting the output of respiratory tract fluid in the usual therapeutic doses in man, I cannot say. I continue to look for a substance which will effectively stimulate the output of respiratory tract fluid in doses which have few or no other effects. There is also need for controlled, clinico-pharmacological evaluation of antitussives, using procedures similar to those recently reported by Cass and Frederick.[4] Syrup, as recommended over 400 years ago by Michael Villanovanus,[9] has the advantage as a vehicle for antitussive expectorants, of possessing a local adjuvant, pharyngeal demulcent action. I have found no synergistic advantage in combining several expectorants. Expectorants may be selected from the saline group such as ammonium chloride or potassium iodide, the alkaloidal group such as tincture of ipecacuanha, the saponin group which I have not found particularly effective pharmacologically, the volatile oils or the creosote group.

In the fourth category of antitussive agents I list inhalation of volatile drugs, steam inhalation and aerosol inhalation. I have not had the opportunity of investigating the effect of this type of medication upon the output of respiratory tract fluid.

Finally, and when the above measures fail, recourse may be made to use of narcotic antitussives. Morphine and methadone act through a central depression of the cough reflex. Galenical preparations of opium, such as camphorated tincture of opium and tablet of ipecacuanha and opium, have the advantage of combining central depression with stimulation of the output of respiratory tract fluid. I have not yet investigated the effect of codeine and other derived and synthetic narcotics upon the output of respiratory tract fluid.

Having selected one or more of the above antitussive measures, adjuvant drugs may be included when indicated for the relief of symptoms other than cough. Most frequently useful are antipyretics of the coal tar or salicylate groups

such as phenacetin and acetylsalicylic acid which are usually without serious untoward reactions, and, by relieving febrile symptoms, are commonly said to "break a cold". Sulfonamides and antibiotics should be reserved for serious infection since sensitization may develop and preclude later use.

During 1949 and 1950, antihistaminic drugs were given an extensive trial in the prophylaxis and treatment of the common cold with results which were generally found to be disappointing on later critical analysis. The initial favourable reports prompted me to investigate the possibility that these drugs might stimulate the output of demulcent respiratory tract fluid. The atropine-like actions of antihistaminic drugs suggested the further possibility that these compounds might actually depress the output of respiratory tract fluid. Experimental investigation during the past two years in this department at Queen's University has shown conclusively that two antihistaminics, diphenhydramine hydrochloride and chlorprophenpyridamine maleate, have no effect upon the output of respiratory tract fluid of cats, rabbits, guinea pigs and albino rats in doses from those corresponding to the usual therapeutic dose up to toxic and lethal doses. I have been unable to find any pharmacological evidence justifying the routine prescribing of antihistamines in preparations designed only for the treatment of cough and it seems to me more logical to prescribe antihistamines separately, as and when indicated.

Our studies upon diphenhydramine hydrochloride and respiratory tract fluid have been published.[1] The antihistamine chlorprophenpyridamine maleate was used recently by Manson *et al.*[7] in tablet form combined with acetylsalicylic acid, phenacetin and caffeine and in this form was reported to give 67.8% relief from coughing. A placebo tablet gave 57.5% relief under the same conditions.

Chlorprophenpyridamine maleate was administered to 30 rabbits, 28 albino rats and 21 guinea pigs, anæsthetized to the lower level of Guedel's plane I by intraperitoneal injection of urethane in doses of 1 gm. per kilo body weight and arranged for the collection of respiratory tract fluid after the technique of Perry and Boyd,[8] as modified by Boyd and Ronan[3] and Boyd, Jackson and Ronan.[2] At the end of a period of three hours, chlorprophenpyridamine maleate was administered subcutaneously in doses of 0.1, 0.5, 1.0, 5.0, 10.0, 25.0 and 50.0 mgm. per kilo body weight and the output of respiratory tract fluid followed for a subsequent period of four hours.

None of these doses had any significant effect upon the output of respiratory tract fluid in any species of animal used. To summarize the data obtained, all values for output of respiratory tract fluid, expressed as ml. per kilo body weight per 24 hours, have been averaged for all animals during each of the three hours before and the four hours after administration of chlorprophenpyridamine maleate and these means have been assembled in Table I. For comparative purposes, corresponding means are presented from 16 rabbits, 8 guinea pigs and 15 albino rats used as controls without administration of chlorprophenpyridamine maleate. The output of respiratory tract fluid in the control group was essentially similar to that in the group given chlorprophenpyridamine maleate.

TABLE I.

THE ABSENCE OF EFFECT OF ADMINISTRATION OF CHLORPROPHENPYRIDAMINE MALEATE UPON THE OUTPUT OF RESPIRATORY TRACT FLUID IN RABBITS, GUINEA PIGS AND ALBINO RATS.

	Mean output of respiratory tract fluid (ml. per kilo per 24 hours)	
Hours before or after administration of chlorprophenpyridamine maleate	*Antihistamine-treated animals*	*Controls: no antihistamine*
3 hours before	2.53	2.62
2 hours before	3.67	3.55
1 hour before	3.53	3.33
1 hour after	3.70	3.50
2 hours after	3.65	3.52
3 hours after	3.64	2.78
4 hours after	3.72	2.90

Chlorprophenpyridamine maleate was not given by mouth, the usual route of administration in man, in the above reported experiments, because I did not consider that such a drug would likely give rise to a gastric reflex stimulation of the output of respiratory tract fluid. Antihistaminic drugs possess a degree of local anæsthetic action and it seemed to me that such an action on the mucosa of the stomach would not be likely to initiate reflex stimulation of the output of respiratory tract fluid. However, one cannot be certain until experimental trial has been made. Hence, chlorprophenpyridamine maleate was given by stomach tube to rabbits in doses of 25 and 50 mgm. per kilo body weight and it was without significant effect upon the output of respiratory tract fluid.

These results, together with those noted above upon diphenhydramine, have yielded no evidence that antihistaminic drugs are likely to be useful in the routine treatment of cough. Unless and until such evidence is available, I consider that antihistaminic drugs should be prescribed separately when specifically indicated.

SUMMARY

Pharmacological principles involved in the therapy of cough have been reviewed briefly under five categories: the deliberate disregard of temporary mild coughs; the use of pharyngeal demulcents; the use of expectorants which may augment output of demulcent respiratory tract fluid; the use of inhalations and the use of narcotic antitussives.

Experimentally, chlorprophenpyridamine maleate was found to have no effect upon the output of respiratory tract fluid in three species of animals. Since diphenhydramine also had no effect, the experimental results yielded no pharmacological evidence justifying the routine antitussive use of antihistamines, which should be prescribed separately and only when specifically indicated.

The author wishes to acknowledge with pleasure the technical assistance and co-operation of Mrs. S. M. R. Bidwell, Miss M. A. Wartman and Mr. J. Coates, Jr. The author wishes to acknowledge with pleasure the co-operation of Mr. W. E. Fielding and Dr. Edward Henderson of the Schering Corporation in providing supplies of chlorprophenpyridamine maleate and a grant covering part of the added expenses of the experimental investigation. The remaining added expenses of the experimental work were covered by a grant from the Committee on Scientific Research of Queen's University.

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ARCTIC INTERLUDE

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Yet all experience is an arch where through
Gleams that untravelled world, whose margin fades
For ever and for ever when I move.
—Tennyson

AS OUR PLANE DRONED through the gray September skies, we wondered what Aklavik and its people would be like and what the next two years would have in store for us in the delta of the great Mackenzie River. Innumerable lakes and vast stretches of muskeg crept by under us with the big river winding like a broad silver band northward to the Polar Sea.

My wife and I with our two children had travelled some ten days before from Ontario to Edmonton, gateway of the North. After a short time at the Charles Camsell Indian Hospital where I attempted to learn as much as I could about tuberculosis, that ubiquitous disease of the Northland, we flew in a DC3 of the Canadian Pacific Airlines to Norman Wells, a distance of about 1,200 miles. A few days later we boarded a Norseman seaplane for the rest of the journey.

The Mackenzie could be seen dividing at Point Separation into its terminal channels and the lakes became even more numerous. We had reached the Delta bounded by the Richardson Mountains on the west and the Caribou Hills to the east. A few minutes later Aklavik, Canada's largest settlement north of the Arctic Circle came into view. The roar of the motor faded as the pilot prepared to land. A gentle hesitation as the floats struck the water and our Arctic life had begun.

So it was that I found myself a medical officer for Indian Health Services, a branch of the Department of National Health and Welfare stationed in Aklavik for two years and incidentally the only doctor within several hundred miles. As the plane tied up at the little dock a crowd of natives appeared to catch a glimpse of the new arrivals. Joe Greenland, our handyman, smiled circumspectly from long experience with a succession of doctors, picked up our bags and led the way to the ten room prefabricated house which was to be our home.

In the ensuing days there was much to do—getting settled, meeting all the important people from the trading companies, missions and gov-

ernment administrative offices, to say nothing of visiting my two hospitals at opposite ends of the town and becoming acquainted with their staffs and almost one hundred patients. I learned that Aklavik is indeed the metropolis of the Western Arctic and not the sleepy little settlement that most people think. With its two hotels, meterological station, imposing administrative building, R.C.M.P. subdivision headquarters, several trading companies and impressive radio communications system operated by the Royal Canadian Corps of Signals, Aklavik commands the respect if not the admiration of the visitor. Both the Anglican and Roman Catholic Missions operate a hospital and residential school while the N.W.T. Administration conducts a day school for the benefit of children living in the vicinity. Located as it is on the Peel Channel and more or less central to the Delta, Aklavik is visited by the Eskimos to the north and the Indians to the south for purposes of trade and the purchase of supplies. The muskrat wealth of the Delta's lakes finds its way to Aklavik where competition among the trading companies raises prices and enthusiasm each spring.

With my background fortified with considerable information I could devote some time to my medical work with which it is the main purpose of this paper to deal. All Saints' Hospital (Anglican), accommodating about sixty patients in 1949, proved to be the larger of the two institutions of healing. The Immaculate Conception Hospital operated by the Gray Nuns was smaller, with some thirty-five beds. Both hospitals enlarged considerably before I left in 1951 and now the combined capacity is well over one hundred patients. Both have good x-ray and operating facilities. The hospitals are staffed by their respective missions while the doctor in charge is a civil servant of the Federal Government. Besides supplying the doctor, the Government subsidizes both institutions by means of

day rates for Indians and Eskimos, indigent whites and half-breeds. On the whole, the system works well considering the difficulties of operating and staffing hospitals in the far north.

At least 90% of my hospital patients had tuberculosis. As my previous experience with that disease was limited, there was a great deal for me to learn. Fortunately, consultation with the doctors at Camsell was available at all times by radio. X-ray films taken at our hospitals were sent to Camsell for official interpretation and reports returned for filing. Pulmonary tuberculosis of course was the most common form to be encountered. Primary lesions in children were

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frequently turning up in routine x-rays and surveys as well as the more serious secondary lesions in adults. Our armamentarium consisted of the usual bed rest and adequate diet with collapse therapy in the form of pneumothorax or pneumoperitoneum in selected cases. Patients requiring chest surgery were flown to Camsell. Streptomycin and PAS were available for use when indicated. Given proper care both Indian and Eskimo respond well.

Tuberculosis of the bones and joints was not uncommon and after a period of immobilization in plaster at Aklavik most of these were flown to Camsell for operative treatment. Pleurisy with effusion is common and is considered to be tuberculous unless proved otherwise. During the two years I was in Aklavik three cases of tuberculous meningitis were treated with considerable success by means of intramuscular and intrathecal streptomycin and oral PAS. One of these had a relapse after medication was stopped but improved with another course of treatment. It is not certain of course, that any of these apparent cures will be permanent. One case of renal tuberculosis was found and after the intravenous pyelogram showed a non-functional kidney, the child was flown to Edmonton for surgery.

Diagnosis was sometimes hindered by the lack of bacteriological facilities. The small laboratories in the hospitals, while adequate for routine tests and sputum examinations, were not equipped with the more elaborate materials necessary for doing cultures. Consequently, we had to send urine and sputum specimens to Camsell for TB culture. During freeze-up and break-up when flying was suspended this aid was denied us and delays in diagnosis were inevitable.

My day began with a visit to one of the hospitals when pneumos or other surgical procedures were done. Out-patients' clinic followed, with a miscellaneous collection of natives awaiting attention and requiring everything from tooth extraction (at which I became quite adept) to the opening of abscesses and fitting of glasses. Otitis media was common, as was also conjunctivitis and keratitis, frequently with scarring, especially in children. Many upper respiratory and intestinal infections were seen at these clinics with some cases of pin worm infestation. Tape worm was occasionally encountered, probably as a result of eating raw frozen or dried fish, a custom followed by both Eskimo and Indian. Many native women are coming to value pre-natal care and often there would be one or more expectant mothers requesting examination. Fortunately, most natives speak some English and it is usually possible to find someone to act as interpreter when necessary. It was often advisable to admit an adult or child for intensive treatment or observation. The problem of adequate isolation of the ordinary medical or maternity case from the tuberculous patient in an overcrowded hospital was not an easy one to solve and conditions are not yet ideal in this respect.

The afternoon was spent in my office in the Administrative Building sandwiching the inevitable paper work between examinations and inoculations of screaming native kiddies. The evenings were free unless an emergency occurred or I was called to the Army Signal Station to give medical advice by radio to some

Fig. 1.—Aklavik, N.W.T.

Fig. 2.—Bringing sick Eskimo to plane.

settlement such as Tuktoyaktuk on the Arctic Coast, Fort McPherson on the Peel River or Fort Good Hope and perhaps Fort Norman on the Mackenzie, the southernmost limit of my territory. An R.C.M.P. constable in Old Crow across the mountains in the Yukon might be worried about a sick Indian child or a teacher faced with a problem in obstetrics. Very often the history was incomplete but it was usually possible to make at least a tentative diagnosis. Then the constable or teacher would be instructed to treat the case with the medicines available at the settlement. Indian Health Services places a goodly supply of drugs including penicillin at each community so that usually the results were good.

One such evening comes readily to mind. The nurse at the Fort Norman Nursing Station about three hundred miles from Aklavik called to tell me that she had a white woman with a retained placenta for some hours following delivery. What should she do? I advised her to try repeated injections of pituitrin or ergometrine and to make an effort to express the refractory organ. In the meantime, I began to make plans for a flying trip to Fort Norman in the Waco of the Aklavik Flying Service with Mike Zubko, an experienced bush pilot. In a few hours, however, the nurse called again to say that our treatment had been successful and the trip was unnecessary.

All emergencies did not solve themselves so easily. My wife and I were about to attend a Hallowe'en party in full dress costume when the telephone rang (yes, there are telephones in Aklavik). I was summoned to the Signal Station to give advice in a more difficult situation. An Eskimo girl, wife of a reindeer herder had been ill for some weeks with vague abdominal symptoms and was evidently in poor condition. To make matters worse, the freeze-up was upon us and Mike was not at Aklavik with his Waco. With permission of Dr. W. L. Falconer, Director of the Camsell Hospital, I radioed Yellowknife for a plane. After being delayed a week by bad weather the Stinson arrived and the pilot and I took off in search of our patient who was at a reindeer herders' camp on the Anderson River some two hundred miles from Aklavik. We found the camp in the November dusk and landed on a small lake nearby. I did what I could for the patient who looked emaciated and had several bed sores. The history obtainable was sketchy and the diagnosis obscure but I suspected tuberculosis. The pilot and I slept in an Eskimo tent that night. In the morning we loaded the patient aboard the plane and after dodging low hanging clouds over the Barren Lands and being forced to land on one of the nameless lakes to await clearing skies we arrived at Aklavik. As it happened, the patient did not have tuberculosis and probably had been suffering from an intestinal infection. She made a good recovery but a year later developed pulmonary tuberculosis. Eventually, she was flown to Camsell where a thoracoplasty was done with good results.

Space does not permit me to enlarge upon numerous other emergency trips made with the aid of the Aklavik Flying Service or of the near disaster which resulted in the loss of the Waco although Mike and I were merely shaken up. These experiences are woven into the texture of

Fig. 3—The author.

Fig. 4.—Eskimo woman.

northern practice and remain as memories to relive with one's friends around the fireside on cold winter evenings.

Early in 1950 a few months after our arrival, I was given a lesson in practical epidemiology. A white child recently returned from Edmonton came down with measles and although every effort was made to isolate him the disease spread relentlessly, first to the white children with whom he had been playing before his rash appeared and later among native kiddies who had been in contact with the whites. I realized that almost everyone in Aklavik had been exposed and that further isolation was useless. I attempted with the aid of the R.C.M.P., however, to prevent native traffic in and out of the town by dog-team lest the disease spread to the numerous Eskimo and Indian camps of the Delta and surrounding settlements. The natives already in Aklavik set up housekeeping in several

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available shacks and proceeded systematically to develop measles.

Evidently a similar epidemic had occurred about 1935 so that I expected all those of fifteen years or under to become infected and I was not disappointed. The native due to his primitive living conditions very easily develops complications such as broncho-pneumonia, otitis media and of course exacerbation of a smouldering tuberculosis. Many times I made the rounds of the shacks giving penicillin in order to prevent secondary infection.

The attempt to quarantine Aklavik failed, as might have been expected, when some natives left town without permission and took the disease to camps in the Delta and to Fort McPherson. Reports soon reached us of whole families stricken in some camps and of children who were so ill they could not be brought to Aklavik over the rough trails in the sub-zero weather. I knew many of these people would develop the inevitable sequelæ unless something were done. I felt it advisable to fly to a number of these camps and see the conditions for myself. At the first camp I found the mother dead probably from pneumonia following upon measles. At other camps the food supply was low, with resulting malnutrition and increased susceptibility to illness. With the aid of the Government Administrator a survey of the whole Delta was planned and in the next few weeks almost all the camps were visited or otherwise checked in spite of the bad weather and incredibly rough landings on many of the drifted lakes. Children with measles were flown to Aklavik where an emergency hospital was organized in the Government Day School with the help of volunteer nurses.

Over one hundred patients were cared for in this way, many of whom had developed otitis media or pneumonia before being admitted. A generous supply of meat was obtained from the Reindeer Station and other nourishing food was supplied by the N.W.T. Administration. Many Aklavik citizens loaned beds and blankets. The Camsell Hospital sent Dr. J. P. Harvey and three nurses to assist with the work.

Many cases appeared at Fort McPherson where fortunately the nurse in charge of the nursing station was able to handle the situation. Most of the natives of that area were in the settlement when the disease struck and could be treated in their homes.

In late January, I received a radiogram from Miss Robinson the welfare teacher at Tuktoyaktuk informing me that the inevitable had occurred there too. Some Eskimo had entered the settlement unseen by the R.C.M.P. and had broken out in a rash which could be nothing but measles. Of course he was isolated but in two weeks several children had rashes. There were an estimated sixty children in Tuktoyaktuk who might be expected to contract the disease. Clearly the teacher could not be expected to care for these herself, scattered as they were all over the settlement and across the harbour. So leaving Aklavik to take care of itself for a day I flew one hundred miles to the little coastal port, whose Eskimo name means "the place where the caribou were killed", to assess the situation and arrange to give Miss Robinson some help. She took me to a number of cases that night. We had

Fig. 5.—Eskimo mother and child.

Fig. 6.—Eskimo family.

to cross the harbour by dog-team to see several of them. It seemed evident that another emergency hospital was necessary to care for these children and those who would later become infected. In a radiogram to Aklavik I asked the Administrator to send some supplies and volunteer nurses to run the hospital which was to be set up in the day school. Assistance arrived the next day and I was able to return to Aklavik.

Gradually the epidemic burned itself out with a loss of fifteen lives more or less due to its ravages. The patients in the emergency hospital at Aklavik were x-rayed before discharge and several were found to have active tuberculosis. These were transferred to the mission hospitals, already overcrowded.

Besides holding the position of Medical Officer for Indian Health Services, the doctor at Aklavik is also the Medical Officer of Health of the N.W.T. Administration for the area which extends from the Arctic coast to Fort Norman, a distance of about four hundred miles. Public Health problems such as sewage and garbage

disposal, water supplies, inspection of hotels and public eating places confront the solitary doctor.

At first sight many of these problems seem virtually impossible to solve. The permafrost makes pit privies inadvisable as the normal bacterial decomposition does not take place and the drainage is poor. When buckets are substituted a sewage collection system becomes imperative. Collection systems cost money to operate and many of the natives living in Aklavik and the other settlements cannot afford to pay the monthly fee, although most whites are able and willing to do so. In fact such a system has been in operation in Aklavik for the past four years and has done much to keep the town clean although many natives do not contribute towards its maintenance. The collected sewage and garbage is dragged on a stone boat or sled by a caterpillar tractor to a dumping ground outside the town. In winter the refuse is deposited on the ice of the river where it remains until break-up.

Drinking water is obtained from ice cut in the early winter from the river and stored in ice-houses where it keeps until the following autumn. Two years ago the Administration installed a summer water supply in Aklavik which operates from May until freeze-up in late September. A filtration and chlorination system makes this supply safe during its period of use. The smaller settlements have no such water systems and depend solely on ice. No one boils the ice-water and while I do not consider the unboiled water safe, amazingly enough there have been no outbreaks of typhoid in the Aklavik area to my knowledge.

The problem of the disposal of household waste water also confronted me. This water is run into open ditches along the streets which theoretically drain into the river but often cave in and cease to function. In summer the ditches become malodorous and in winter great glaciers of ice fill them and by slow melting in the spring further obstruct drainage. An underground system is of course impossible both in winter and summer because of the permafrost. So it is that problems which might be easily solved in warmer climates become formidable obstacles in the Arctic.

While it is easy to see that public health facilities are not perfect, those which do exist are object lessons to the natives with reference to keeping their camps clean. My wife, a registered nurse, with the assistance of Miss P. Hockin, superintendent of All Saints' Hospital, undertook to give a movie program each month to native women on health subjects combined with a simple explanation of the principles involved. The films were obtained from the office of the National Film Board in Edmonton and dealt with material such as personal hygiene, child care and tuberculosis.

The Eskimos and Indians themselves are very interesting although their native customs have become greatly modified. Anthropologists hold that both are of Asiatic origin. Before the advent of the white man the Western Eskimos inhabited the barren coast, hunting for a living on land and sea and rarely invading the forested Delta. With the adoption of the trapper's life they have been forced to build permanent camps in the Delta and to renounce their former nomadic habits to a great degree. The Indian too, has tended to build his camp near a trading post, hence the origin of the settlements along the Mackenzie in the latter part of the last century. Aklavik was one of the last to appear, having been begun about thirty years ago. The Eskimos of the Delta are distantly related to those farther east at Coppermine, Baffin Island and even Greenland although the language has changed considerably over this wide area. The Mackenzie River Indians belong to the large Athapaskan family which includes the Chipewyans, the Slaves, the Hares around Fort Norman and Fort Good Hope and the Kutchins or Loucheux of the Yukon. Some Loucheux settled in the Peel valley in the region of Fort McPherson which was a flourishing trading post in the early years of this century. A few Loucheux from Fort McPherson later took up residence in Aklavik and surrounding Delta.

One might well wonder about the native's future. Civilization has thrust itself upon him, very rapidly and radically modifying his way of life, his diet and his heredity. There are few pure-blooded Eskimos in the Western Arctic, due to intermarriage with traders and whalers several generations ago. Jenness feels that these native races will finally be absorbed into the white race and disappear forever. The original high protein diet has been supplanted by the high carbohydrate one of the white which is readily obtainable at the trading posts in the form of flour, oatmeal and sugar. It is easy to

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imagine that vitamin deficiencies must be more common than when the meat diet, much of it raw, prevailed. The change in food has had an adverse effect on the teeth, and caries is now very common. Then too, the availability of carbohydrates and dried fruits has led to the manufacture of home brew which although illegal is virtually impossible to eradicate.

The more settled life now lived by the native in permanent camps has created problems of household cleanliness which did not arise while he was living a nomadic existence. His energies are spent trapping the furs for which he is paid in cash by the trader. He then has to buy his food from the trader at prices much higher than he can afford. The result of this cycle is that he is almost always in debt. When he manages to accumulate some money he will spend it on trifles, without regard for next winter's vicissitudes. Government relief is available for indigent families but with better management many of them could avoid destitution. Family allowance has helped considerably but again is not always wisely spent.

It seems that the psychology of both the Eskimo and the Indian will not permit them to take thought for the morrow. Education may perhaps be the answer to some of these problems. In the past few years the Government has built day schools at each settlement along the Mackenzie. A "welfare teacher" is employed to teach and conduct social work among the natives at each town. Mission residential schools have been in operation at Aklavik for some years. Perhaps in a few more generations we may see the results of the educational program in a more effective native economy.

Since the war a vigorous campaign has been launched by Indian Health Services to control the high incidence of tuberculosis among both Indians and Eskimos. I was furnished with portable x-ray equipment with which I made a number of surveys from Fort Franklin on Great Bear Lake to Tuktoyaktuk on the Arctic coast. Particularly interesting were the trips with the Treaty Party each summer. It was my duty to accompany the Indian Agent on his annual visit to each settlement in my district at which time the treaty money is paid to the Indians. Advantage was taken of these occasions to x-ray as many as possible. Inoculations for diphtheria and vaccinations for smallpox were often administered at the same time as part of a program of preventive medicine.

I should like to pay tribute here to Dr. Axel Laurent-Christensen a former officer of the Danish Medical Service who joined me several months before my tour of duty was completed. Dr. Laurent-Christensen had spent nearly thirty years among the Greenland Eskimos and proved a fine complement to our medical service. He assisted me in doing the first BCG vaccinations in the Canadian Arctic in the residential schools at Aklavik. He also performed life-saving operations on several occasions when I was away on trips.

As the active cases of tuberculosis are weeded out and the standards of living and health are raised by increasing education, it is hoped that Canada's native citizens may be enabled to participate to a greater extent in the development of our great Northland.

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MORE STUDENTS PLAN TO ENTER GENERAL PRACTICE

Student polls and medical school programs reveal a rising trend toward the general practice of medicine, according to Dr. Donald G. Anderson, secretary of the Council on Medical Education and Hospitals of the American Medical Association.

"Student polls taken over a period of the last three academic years indicate that the percentage of students planning to enter general practice has increased from 36 to 47%, and that the number planning to specialize decreased from 36 to 31%," he said. "During the academic year 1949-1950, thirty-one classes in nineteen medical schools were polled by their schools to determine the students' plans with respect to practice. The over-all averages for the students in the thirty-one classes were as follows: 47% planned to enter general practice and 31% to specialize; 22% were undecided.

"Forty-two schools have programs specifically designed to stimulate the interest of students in careers in general practice. Thirteen schools report the establishment of preceptorships with practising physicians as regular assignments in the medical school course, nine having established them within the last two years.

"Fifteen schools are sponsoring in their affiliated hospitals internships specifically designed for prospective general practitioners. Twelve schools are sponsoring residences in their affiliated hospitals for prospective general practitioners. Several other schools have similar programs under consideration."

Nearly two out of every three physicians in private practice in this country are general practitioners, according to the A.M.A.'s recent count of physicians in connection with its publication of the eighteenth edition of the American Medical Directory.

A FOLLOW-UP OF RECRUITS REJECTED FOR PULMONARY TUBERCULOSIS IN WORLD WAR II*

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SOME TIME AGO, in discussion with Dr. W. P. Warner, Director General of Treatment Services, Department of Veterans' Affairs, the idea was conceived that valuable clinical information might be obtained by following up those persons who were rejected by the Armed Services during World War II on grounds of pulmonary tuberculosis. It was also thought probable that information might be obtained which would be of interest in the event of future mobilization. A somewhat similar idea was expressed in 1940 by Colonel W. A. Jones,[1] consultant radiologist, National Defense Headquarters, when, in discussing the preliminary results of routine chest x-ray of all recruits he stated,

> "Many curious and valuable facts would doubtless emerge from a study of the films and reports made in this survey, and it is to be hoped that after the war some authority will cause this to be done. The records of individuals for the years following the radiographs will add to the value of such a survey."

The purpose of the project now being reported upon was to investigate the present status of a group of persons who were rejected from service during the recent World War because of x-rays suggesting pulmonary tuberculosis, especially where the disease was minimal or asymptomatic; and further, to ascertain whether any of those rejected on such grounds could not have been enlisted for service in a limited capacity.

The regulations which were established in 1939 concerning the interpretation of recruit x-rays, were repeated as appendix I of the 1943 edition of Physical Standards and Instructions, and again were carried forward unchanged into the 1945[2] edition of these instructions. In addition to appendix I, in the 1943 and 1945 editions there is a paragraph (section 74) concerning pulmonary tuberculosis, which refers the examiner to appendix I, for details. This appendix deals with x-ray shadows, and it is admirable in itself, but neither the appendix nor section 74 contains any provision for the re-examination of doubtful or borderline cases. This resulted in many rejections which, on the basis of our eight year follow-up, do not seem to have been justified.

Our survey was carried out as follows:

1. Enlistment films of recruits rejected with a diagnosis of pulmonary tuberculosis were obtained from the Central Film Library in Ottawa. In the vast majority, the films were accompanied by form MFM30, containing the radiologist's report, the report of the consultant in medicine, and the final diagnosis.
2. The films were re-read by a radiologist (E.F.C.) and an internist, and salient points were noted from the consultant's report.
3. Each individual was then sent a follow-up letter and a questionnaire.
4. Replies were studied, and interval history noted (period of sanatorium treatment, results of subsequent examinations, etc.).
5. Requests were sent to the appropriate agencies for the loan of any subsequent films.
6. These follow-up films were read in comparison with the original enlistment film.
7. Originally it was intended to attempt to secure follow-up films of those who had not had x-rays subsequent to the attempt at enlistment, but this part of the survey has not yet been accomplished.

In view of the size of the group under consideration, it was decided to do a preliminary survey of 1,000 cases, and then to enlarge the project if it appeared worthwhile. This preliminary survey has now been completed, with the exception of (7) above. For the sake of convenience, the preliminary 1,000 cases were chosen from the districts of Montreal, Quebec City and surrounding areas. In order to attempt to eliminate the possible influence of geographical factors, it was then decided to survey 500 enlistment films from British Columbia. The follow-up of this latter group was very poor, and they had to be dropped from the survey. The general trend, however, appeared to be much the same as in the case of the recruits from Quebec Province.

We would like to emphasize that nothing in this report is to be construed as in any way a criticism of the work done by the original examining physicians and specialists. Under extremely difficult circumstances, with the pressure of an urgent need for man-power behind them, they performed an excellent job, under the existing regulations.

RESULTS

1. A total of 878 enlistment films were received for review. Of these, 184 were discarded, either because we considered that the disease was non-tuberculous, or because the tuberculosis was

*D.V.A. Research Project 7-x, The Veterans' Hospital, St. Hyacinthe, Que.

so far advanced that the man was obviously very sick at the time of the examination.

2. The remaining 694 cases formed the basis for the survey (Table I). Of these, we agreed with the diagnosis in 420, and did not agree in 194. This refers to the recorded diagnosis only,

TABLE I.

RE-EXAMINATION OF 878 ENLISTMENT FILMS

Films received	878	
Discarded	184	
Films in survey	694	
Agreement with diagnosis		420
Disagreement with diagnosis		194
Insufficient evidence		80
		694

not to the question of whether or not the rejection was justified. In 80, we considered that the evidence was insufficient to warrant an opinion. This insufficiency of evidence consisted largely of inadequate history and poor technical quality in the x-ray film.

3. The questionnaire was answered by 288 persons.

4. (a) In 126 of these we were able to obtain follow-up films. On the basis of the follow-up history given in the reply and examination of the follow-up films, we considered the rejection to have been justified in 73 cases and not justified in 53 cases. (b) In 162 cases, a second film was not received; 70% of these, however, stated in the questionnaire that second films had been

TABLE II.

RESULTS IN CASES WHO ANSWERED QUESTIONNAIRE

	Total	*Rejection justified*	*Rejection not justified*	*No opinion possible*
Follow-up films received	126	73	53	—
Follow-up films not received	162	20	33	91
Patient died of tuberculosis		18	—	—
Totals	288	111	86	91

taken. Of these 162, on the basis of enlistment film plus subsequent history, we considered the rejection to have been justified in 20 cases and not justified in 33 cases. A further 18 were reported as dead of tuberculosis. In the remaining 91, we considered that we could give no opinion as to whether or not the rejection was justified without seeing a follow-up film (Table II).

5. The questionnaire was not answered in 406 cases, in spite of a second letter. Included in this group are 161 in which the letter was returned "addressee unknown". We attempted to express a final opinion on these 406 cases after re-examination of the enlistment film and MFM30, basing the opinion largely on the extent of the disease. In 75 we considered the rejection justified, and in 66 not justified. In 265 there was insufficient evidence for even this somewhat vulnerable opinion. Combining the above figures (Table III), we find that of the 694 cases, we were able to reach an opinion in 320. Of these, we considered the rejection to have been justified in 168 and not justified in 152. In the remaining 374 of the original 694, no opinion could be reached because of insufficient evidence in the enlistment film and lack of follow-up evidence.

TABLE III.

A. Total cases studied	694	
B. Total in which an opinion could be reached		320

	Total	*% of A*	*% of B*
Rejection justified	168	24.2	52 5
Rejection not justified	152	21.9	47.5
Opinion not possible	374	53.9	—
	694	100.0	100.0

DISCUSSION

It would appear that, on the basis of a seven to eight year follow-up using both x-rays and clinical histories, a diagnosis of unstable or active tuberculosis was not justified in nearly 50% of the rejected recruits. Even allowing for some who may have been potentially unstable under full active service conditions, it seems reasonable to assume that many of these rejected recruits could have been accepted for limited service.

In addition to this one salient fact, which in itself we feel requires earnest consideration, we noted many examples of a lack of uniformity in interpretation of the regulations. We list some briefly as follows:

1. There is a very great need for standardization of reports and diagnosis by enlistment boards and consulting specialists. We have noted definite lack of uniformity in the diagnosis and final classification of the pathology present. For example, such terms as "Old Pneumonitis", "A touch of Tuberculosis", or "Suspect T.B.", have no place on an MFM30.

2. Many of the films examined were of such poor technical quality that interpretation was extremely difficult. The instructions, as contained in paragraph 206 of appendix I (intensifying screens must be free from defect; the films must be of a good diagnostic quality), were not adhered to in many cases.

3. Other cases in which there was a strong possibility, from a radiological and clinical point of view, that the disease might have been of virus origin, have been rejected after a single examination. The option of recalling such recruits is set forth in paragraph 207 of appendix I, section I, but we feel that a more positive attitude should be taken and that specific instructions should exist for the deferral and re-examination of doubtful cases.

4. In our opinion, a single x-ray film, often of poor technical quality, plus a single physical examination, do not give sufficient evidence to warrant complete rejection of a border-line case. Many such cases should be recalled for further examination and many could be enlisted for limited service if full advantage is to be taken of available man-power. Paragraph 207 of appendix I, section D and E, while summing up some of the basic principles of this idea, does not establish sufficiently clearly, in our opinion, the criteria upon which a diagnosis of unstable tuberculosis should be made, nor does it provide specifically for the recall of these individuals if there exists any doubt. In this connection we quote from Burke and Parnell[3] in their review of methods of assessment of status of minimal pulmonary tuberculosis:

> "This review has demonstrated that physical examinations, including a search for latent râles, are of little or no value in the assessment of the status of tuberculous lesions of minimal extent. It has, on the other hand, shown that serial x-ray pictures, and examination of specimens of sputum or gastric contents obtained from patients who deny cough and expectoration are invaluable aids in the assessment of the status of minimal pulmonary tuberculosis found on routine x-ray examination of seemingly well persons."

It is interesting to note in this respect that on only three MFM30s, of our total number of cases, was there any indication that sputum examinations had been asked for or done. With regard to the clinical histories, many were of such a strikingly similar pattern that it appears, at least in some instances the recruit was attempting to manufacture a plausible history. Histories of previous pulmonary tuberculosis or idiopathic pleurisy should be in so far as possible confirmed histories, using evidence other than the man's own testimony.

5. It is of interest also to consider the case of seven recruits who, after being rejected on one occasion, were successful in enlisting on another occasion. All of these saw at least a full year of overseas service. In all seven we were able to secure satisfactory followup, including post-war x-rays. In five of the seven (71%) we considered that the original rejection was not justified, and follow-up history and x-rays showed this opinion to be correct. In the remaining two we considered the rejection of the first enlistment justified. On examining the second enlistment films, we still considered they should not have been accepted. Both these men broke down with tuberculosis overseas.

SUMMARY

1. The results of a seven to eight year follow-up of recruits rejected with a diagnosis of pulmonary tuberculosis showed that approximately 50% of the rejections were not justified.

2. We have noted in detail other points which we feel are worthy of further consideration.

3. We would recommend: (a) A thorough revision of our present standards for the x-ray examination of the chest. (b) The adoption of a standard classification of tuberculosis such as that set forth by the National Tuberculosis Association, for final diagnosis on MFM30s.

We wish to extend our thanks to the Director General of Treatment Services, Department of Veterans' Affairs, for making this study possible. We also wish to express our gratitude to Mr. L. C. Stewart, of the Central Film Library, for his invaluable assistance.

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It is well known that a given antigen in different individuals may produce such widely divergent reactions as urticaria, asthma, purpura and arthritis. The actual mechanisms that determine these differences are obscure but such factors as heredity may play a part. Such differences may determine the type of clinical picture that the patient will develop in the group of diseases in which the prominent lesions are collagen and vascular tissue injury. These observations and others emphasize the need for a better understanding of the basic mechanisms of hypersensitivity and the importance of careful investigation of the possible rôle of sensitization in the pathogenesis of a wide variety of human diseases.—A. McGehee Harvey, *Bull. Johns Hopkins Hosp.*, 87: 349, 1950.

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A CLINICO-PATHOLOGICAL STUDY OF THE FEMORAL AND POPLITEAL ARTERIES IN 152 AUTOPSIES*

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A STUDY OF THE FEMORAL and popliteal arteries was made with a view to gaining a better understanding of arteriosclerotic disease as it affects the lower limb. In addition, a detailed review of the pattern which the disease takes at various sites was made in an attempt to correlate the plaques with local or mechanical factors peculiar to the segment of artery in which they occur. This latter work forms the subject of another paper. It is proposed at this time to briefly outline the main features of the disease from a pathological viewpoint, relating them, when possible, to the clinical records, rather than to enter into a discussion of their pathogenesis.

In 1950, Lindbom,[1] made an excellent combined radiological and pathological study of the arteries of the lower limb, from the upper thigh down to the ankle. Prior to this, relatively little work had been done in this field. In 1925 Dow[2] reviewed the major arteries in eight cases and found well marked atheroma in the femoral triangle and Hunter's canal in all eight cases. Ruhl[3] in 1929, dissected 60 specimens of the lower extremity down to the knee and noted definite localizations for the disease. Nordmeyer[4] examined small parts of the vessels but made only one section from the proximal part of the femoral artery and one from the proximal part of the posterior tibial artery.

Routine autopsy material at the Central Division of The Montreal General Hospital was employed in this series. With a few exceptions, unrelated to type of case, autopsies were consecutive, thus allowing a random study of the arteries. In this respect, the series differed from that of Lindbom[1] who tended to select cases over the age of 50 and, to a slight extent, cases of severe aortic arteriosclerosis. Lindbom dissected 356 limbs after injection of x-ray contrast medium. The series to be described is the result of dissection of 152 cases, comprising 304 limbs, without injection.

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Awarded Second Prize in the Interns' Essay Contest of the Montreal Medico-Chirurgical Society, 1952.

In order to retain the relationships of the artery as much as possible, a surrounding block of muscle or fat was removed at the same time. The femoral artery, from just below the ilio-inguinal ligament to the lower end of the popliteal was thus obtained. In 61 of the 304, the profunda and extreme proximal portion of the femoral was not taken. The artery was sectioned and examined, in the gross, routinely at the following seven sites besides other points in certain cases.

1. Femoral artery 1 cm. proximal to profunda femoris branching.
2. Femoral artery just below profunda femoris.
3. Femoral artery at upper end of Hunter's canal.
4. Femoral artery at lower end of Hunter's canal.
5. Popliteal artery lying free in fat pad of upper popliteal fossa.
6. Popliteal artery below level of knee joint, just before its division.
7. Profunda femoris just below femoral artery.

MEASUREMENTS

At each point the lumen diameter was measured and the degree of atherosclerosis, thrombosis or other processes noted. Measurements were made by means of the cone shown in Fig. 1, patterned after the instrument used

Fig. 1.—The cone employed in measurement of lumen diameter.

by jewellers for measuring ring sizes. This instrument was graduated so that measurement to one decimal place of one millimeter could be made with a fair degree of accuracy. It had two drawbacks. Firstly, there was a tendency to dilate the artery when the cone was slipped into place. This was largely overcome by having all measurements made by the same person using that point where the arterial wall first came in contact throughout its circumference. The other source of error was where a flat arteriosclerotic plaque distorted the round contour of the lumen so that the instrument could not make satisfactory contact. This latter experience fortunately did not arise too frequently, and when it did, a reading was taken where as much of the circumference as possible made contact.

The atherosclerosis was graded in an arbitrary fashion with a system of plus signs.

One plus—slight thickening of the intima.
Two plus—a definite plaque causing minimal bulging into the lumen.
Three plus—a plaque bulging into the lumen to cause a considerable degree of obstruction (usually amounting to 30 to 50% occlusion).
Four plus—a plaque largely replacing the lumen of the artery.

Here, again, a certain amount of difficulty was encountered in classification because of the several varieties of atherosclerotic lesion noted. As all observations were made by the same individual, the classification did serve to compare the extent of the lesions from case to case.

Finally the measurements of lumen diameter and the degree of atherosclerosis at each of the seven sites were plotted and a curve drawn for each artery. To this graph, the pertinent clinical data were added. All measurements were made in the fresh state, and the arteries then fixed in 10% formalin and kept. A comparison in measurement in one case without atherosclerosis was made before and after fixation in 10% formalin. There was a uniform shrinkage of the lumen diameter by approximately 30%.

ANASTOMOSES

When the possible anastomoses of the femoral and popliteal arteries are studied from a standard reference on anatomy,[6] it is noted that there is a wide range of possibilities. Arteriograms of of occluded vessels of the lower limb confirm this, and it is noted that a large number of vessels of small calibre, usually tortuous and following no definite pattern, appear as collaterals. Although no detailed study of this matter was made in this series, it was noted without exception that the branches of the femoral artery, once the profunda had been given off, were numerous but individually very small. The general main anastomotic scheme is the communication of the perforating branches of the profunda with the inferior gluteal artery down the back of the thigh and a reunion with the femoral and popliteal through the numerous small branches described. Thus the profunda femoris is of major importance in the arterial supply of the lower limb. Anatomical studies[7] of arterial supply of muscle and studies of gunshot wounds of muscle[5] demonstrate that most muscular arteries are functionally end arteries, and their destruction results in uniform ischæmia of the part of the muscle supplied. From this it would seem that muscular arteries do not normally form part of the rich anastomosis, but under conditions of slower occlusive processes, they probably take part.

In the 243 instances where both the femoral and the profunda were examined, the profunda was the larger in 46 arteries, the femoral the larger in 178 arteries. In most instances their relative sizes were close and in 11 they were the same. The remaining 8 were anomalous in that, the medial or lateral circumflex, usually a branch of the profunda, came directly off the main femoral artery.

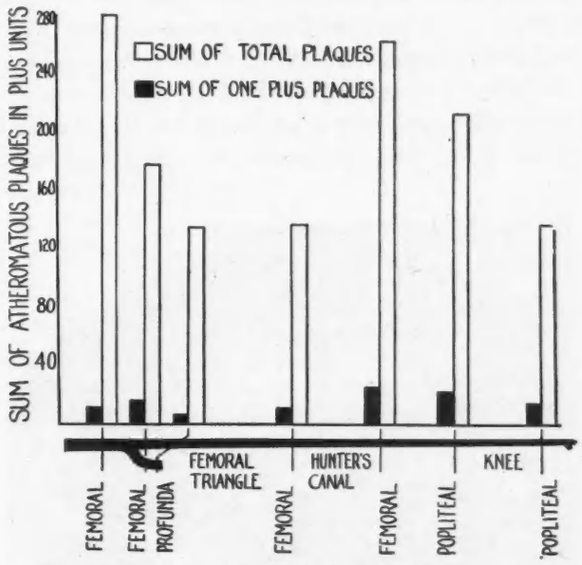

Fig. 2.—Graph to show incidence of one plus (early) plaques unassociated with more advanced plaques (black columns). At the same sites the total plaques of all types are also plotted (white columns).

SITES OF ATHEROSCLEROSIS

In order to study the sites where atherosclerosis was first seen in its earliest stages, all graphs showing one plus atherosclerosis and no more than this were reviewed. A graph was then plotted to indicate at what sites the earliest type of lesion developed most frequently (Fig. 2). Corrections of the results were made so that the fewer profunda arteries examined were on the same numerical basis as the femoral and popliteal. Then, all the plus signs in all the graphs at the seven individual sites were added together and plotted to indicate where all forms of atherosclerosis were most pronounced (Fig. 2).

In no instance was there complete occlusion by atherosclerosis alone; several instances were observed where occlusion was almost complete, however.

It was frequently noted that fresh intimal hæmorrhages were present. The sites tended to

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follow the sites of the maximal plaques and in no instance was hæmorrhage noted unassociated with a plaque. In one case (Fig. 3) the hæmorrhage was large enough to greatly enlarge the atheromatous plaque in which it occurred. In most instances hæmorrhages were small and tended to be crescentic in shape, following the general contour of the vesseel wall. In a case of primary thrombocytopenic purpura with multiple petæchial hæmorrhages throughout the body, it was interesting to note hæmorrhages in the few intimal plaques of the lower limb arteries but not in the normal artery wall. Similarly, a case of severe malnutrition with a probable element of scurvy, demonstrated extensive intimal hæmorrhages related to advanced generalized atherosclerosis. For the most part

Fig. 3.—Popliteal artery just below knee joint from a case of cirrhosis of the liver in a 73 year old male. A large intra-mural, partially organized hæmorrhage is present in association with an atheromatous plaque. (Phospho-tungstic acid hæmatoxylin).

however, intimal hæmorrhages occurred in the absence of recognized hæmorrhagic diatheses but tended to correspond to hypertensive cardiorenal disease although also with other less well defined disease processes.

Lindbom[1] found a very high association of thrombosis with intimal hæmorrhage. No detailed record of hæmorrhages was kept in this series except when they were noted at the seven sites mentioned. However, in the numerous other sections made, they were frequently observed.

Of the 304 arteries studied, thrombosis was found in 18. It was bilateral in 6, unilateral in 6. In all instances except one, the thrombus occupied the femoral artery in Hunter's canal, sometimes extending proximally to the orifice of the profunda. The lower popliteal remained patent. The one exception was a case of profunda thrombosis on the left with thrombosis of the femoral in Hunter's canal on the right. All instances of thrombosis accepted in the series were undergoing organization or were well organized and recanalized by minute new channels. Two instances of bilateral blood clot within the popliteal artery were difficult to distinguish from post mortem clot, either microscopically or in the gross. If they were thrombotic, they were not many hours old. Lindbom had similar cases of questionable thrombosis and excluded them from his series.

Boyd,[8] in his clinical work on arteries of the lower limb, noted that thrombosis of the popliteal artery gave a poor prognosis for the leg, but a good prognosis for life. He also remarked that thrombosis of the femoral artery had a poor outlook for life but a good outlook for the limb. These observations are confirmed in the present series, the occluded femorals dying of something else and coming to autopsy, the occlusions lower down developing gangrene requiring amputation. Lindbom's incidence of thrombosis of the femoral or popliteal arteries was 20 of a total of 73 occlusions in 186 cadavers. The leg was the site of the remaining 53 occlusions in his study. He found that Hunter's canal was strikingly the predominant site of femoral artery thrombosis, and that thrombosis of the profunda was equally strikingly rare. Propagation of thrombus in Hunter's canal usually extended proximally, sometimes as far as the profunda. The scarcity of branches in this proximal portion of the artery is considered to influence propagation.

Embolic occlusion was very difficult to assess. In this series there were no occlusions associated with sudden onset of symptoms. There were often cases with a possible source of emboli. No attempt was made to differentiate the occlusions, therefore; suffice it to say that no clear-cut case of occlusion by embolus occurred in this autopsy material. Lindbom concluded that "the large majority of the arterial occlusions in the autopsy material were therefore probably caused by thrombosis".

Venous occlusion was noted in 25 of the 304 lower limbs. There was no apparent relationship to arterial occlusion. Pelvic tumour causing "frozen pelvis" was present in association with seven lower limbs showing venous thrombosis. In two cases with large vein thrombosis where the

pulp of the great toes was microscopically examined in a study of the glomus bodies, venous thrombosis was noted in the subcutaneous veins of the toes.

IRREGULARITY OF LUMEN

One of the most interesting aspects of the study was to observe how irregular the lumen of these arteries was by measurement, quite apart from atherosclerotic plaques. As far as the author is aware, this is the first time that accurate measurements of the lumen diameter of peripheral arteries has been made although measurements of arteries have been recorded by microscopical methods. There were 45 arteries

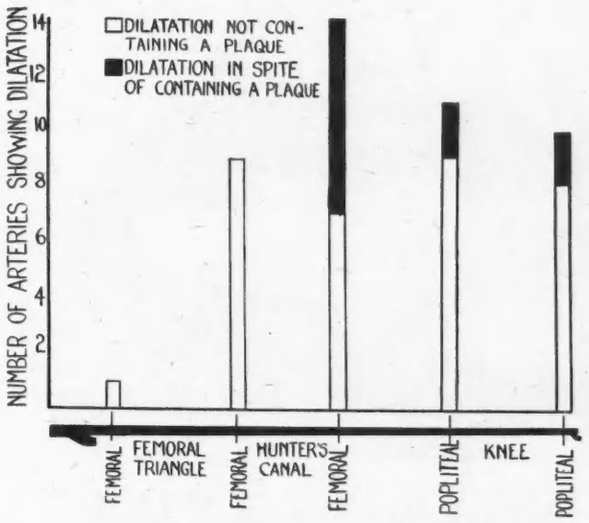

Fig. 4.—Graph to show incidence of dilatation in excess of 1 mm. at various sites distal to a normal appearing, relatively narrow segment. Black columns indicate incidence and sites where a plaque was present in the dilated segment, the relative dilatation still being present in spite of it.

of the 304 (a percentage of 14.8) which showed the phenomenon, in the femoral or popliteal arteries below the profunda, of a distal segment of artery having a lumen diameter greater by one or more millimetres than a grossly normal proximal segment of the same artery. In a few cases this amounted to as much as 50% difference in lumen diameter and usually it was at least 20%. The sites of this relative fusiform dilatation are plotted according to incidence, in Fig. 4. When the dynamics of flow through these arteries is considered, it is at once apparent that such variations in lumen diameter are of major importance.

The average age of these cases at death was 57. Their average brachial blood pressure was 137.5/74.5. Of these 45, 11 arteries had this degree of distal dilatation even though there was one or two plus and, in one instance, three plus atherosclerosis in the dilated segment. It is conceivable that more extensive atherosclerosis may have been related to such dilatations but the size of the bigger plaques so decreased the lumen diameter that this question could not be satisfactorily explored. Several instances of a fusiform dilatation above the branching of the profunda femoris were noted. These were bilateral, extending down from just below the ilioinguinal ligament to the bifurcation. The corresponding external iliac artery and the extreme proximal end of the femoral were relatively smaller.

Similar dilatations have been noted by Lindbom[1] but he made no study of them, as his injection method, he felt, would make such a study unreliable. Horn and Finkelstein,[9] in a study of 100 coronary arteries, recorded 3 instances of "diffuse tubular dilatation of the lumen despite definite arteriosclerotic involvement". Blumenthal, Lansing and Gray,[10] consider that "arteriosclerosis consists primarily of the progression of chemical and physical changes in elastic tissue which reduce the resiliency of the arterial wall and result in dilatation of the vessel". They quote Thoma[11] and Kaefer, Klotz,[12] and Wells[13] as having similar views.

Comparison of histological sections of the dilated distal segment of an artery with the proximal relatively narrow portion is shown in Fig. 5.

CLINICAL CORRELATION

There were no instances of gangrene in the series. In only two of the 18 cases of established femoral and upper popliteal artery thrombosis, were there symptoms referable to the leg recorded in the case histories. Both of these cases had had lumbar sympathectomy for severe intermittent claudication and impending gangrene at a previous date. One of them died of a ruptured arteriosclerotic aneurysm of the external iliac artery. Herget,[14] noted that of 55 cases of arteriographic studies of patients with unilateral complaints, bilateral alterations could be demonstrated in 51 and in 29 of them bilateral obliteration involved chiefly the adductor canal. One other case of femoral artery thrombosis in the present series had a history of delayed healing of the wound of an open reduction of a fractured os calcis on the occluded side.

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Thus most cases of thrombosis of main arteries of the lower limb were apparently silent. The average brachial blood pressure of this group of occlusions was 198.5/104. All of them died of either myocardial infarction, heart failure, cerebro-vascular or other vascular accidents except for three. One of these exceptions had carcinoma of the larynx, another, carcinoma of the thyroid, and the third, advanced malnutrition with small bowel obstruction by a peritoneal band.

The lowest blood pressure recorded in cases exhibiting 4 plus atheromatous plaques was 180/80. The average age of these individuals was 66; this figure would have been higher but for the case of a 33 year old man with malignant hypertension (B.P. 240/175) who died of a cerebral hæmorrhage and had bilateral 4 plus atherosclerosis throughout his thigh except in the femoral triangle. All blood pressure recordings accepted were those taken prior to acute episodes and terminal events. Other recordings were not employed throughout the study.

In 5 cases the aorta was only minimally involved by atherosclerosis, while the lower limb vessels were extensively diseased. There were 16 cases of minimal (one plus or less) atherosclerosis of the thigh vessels associated with extensive aortic disease.

There were 27 cases in which there had been myocardial infarction at some time. None of these cases were free of atheromatous plaques in the lower limb. Only 4 cases of established diabetes were autopsied. All of them had atherosclerosis of the thigh vessels. Of the total 152 autopsies, 29 cases completely free of atherosclerosis of the femoral and popliteal arteries were recorded: 16 of these 29 cases were over age 50. There were 33 autopsies under age 50.

Occlusion of the common and/or the internal carotid artery was present in 8 carotid arteries of this series. As most of the autopsies, but not all, included the brain, there was probably a slightly higher incidence of carotid occlusion than this figure represents.

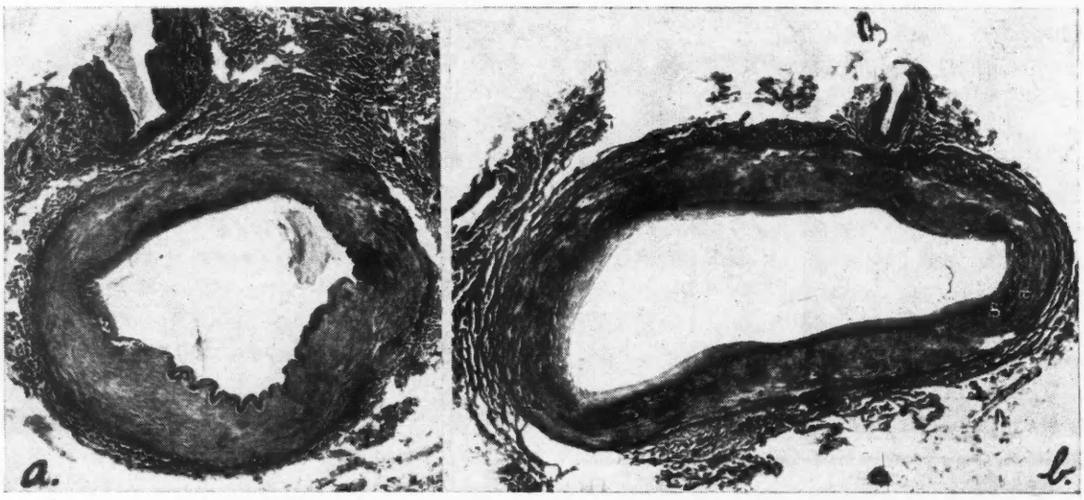

Fig. 5.—A 47 year old female with carcinoma of the rectum. (a) A section from the right femoral artery in the femoral triangle. (b) A section of right popliteal artery in its upper portion. Note the difference in size of the lumen, that there is thinning of the muscle of the media in (b) as compared with (a), and that in (b) there is relatively more intimal elastic tissue but that it has lost most of its normal undulant character. (Phospho-tungstic acid hæmatoxylin). The same magnification in both.

SUMMARY

The femoral and popliteal arteries in 152 autopsies were examined and the lumen diameter and atherosclerosis recorded at various sites.

There were 18 occluded arteries of the total 304 limbs. Two of these occlusions had clinical histories of intermittent claudication, another had slow healing of a wound; the remainder were apparently asymptomatic as far as the lower limb was concerned. The average brachial blood pressure of this group was 198.5/104.

The site where most early atheromatous plaques were found was the exit from Hunter's canal. This site was slightly exceeded by the femoral just above the profunda when the total of all grades of plaque was recorded.

Fusiform dilatations of a distal segment of an

artery compared to a normal appearing proximal segment was noted in excess of 1 mm. in 14.8% of all the arteries. The incidence of dilatations at various sites was plotted and found to be maximal at the exit from Hunter's canal. A microscopic comparison was made of this phenomenon at two levels in one of the cases. The average age for these cases at death was 57. Their average brachial blood pressure was 137.5/74.5.

An attempt is made to correlate various grades of atherosclerosis of the thigh arteries with the aorta. The association with hypertension and diabetes is briefly reviewed, and finally the incidence of myocardial infarction and of thrombosis of the carotids was mentioned.

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INTUSSUSCEPTION*

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THIS STUDY covers 575 cases of intussusception at the Hospital for Sick Children, Toronto, including all cases from 1915 to October 30, 1950. These have been divided into three groups as shown in Table I with respective mortality rates for each group.

TABLE I.

	Cases	*Deaths*	*Mortality*	*Cases operative*	*Deaths*	*Op. mortality*
Group I (1915-29).....	236	65	27.5%	234	65	27.5%
Group II (1930-39).....	148	26	17.6%	146	24	16.4%
Group III.....	191	10	5.2%	187	8	4.2%

The significant feature is the marked fall in mortality rate in the past ten years with a current overall mortality rate of 5.2% and operative mortality rate of 4.2%.

Table II reviews the age incidence.

We can see from this: (1) Intussusception is exceedingly rare under the age of 3 months. (2) It is sufficiently common between the ages of 2 years and 14 years that we should not rule it out in our consideration of the acute abdomen. (3) There is no age group in which the mortality is disproportionately high.

The sex incidence was 367 male to 208 female, or a ratio of 1.8/1. The fact that the mortality rate rises with the duration of symptoms is well demonstrated in Table III.

It is quite significant that in 105 cases operated upon in the last ten years within 24 hours of the onset of symptoms, no deaths occurred. Because of this we do not attempt routine reduction by barium enema. The only cases it is successful in are early cases, and in these the surgical mortality rate in good hands, and this includes an anæsthetist experienced in infant anæsthesia, is practically zero. Moreover, in enema reduction there is no real assurance that the reduction is complete.

TABLE II.

Age	*No. of cases*	*Percentage*	*Deaths*
Under 3 mos.	7	1.2	1
3 mos. to 1 year.....	349	61.8	63
1 year to 2 years....	90	15.8	18
2 years to 6 years...	89	15.6	14
6 years to 14 years..	32	5.6	4
Total.....	567		101

Youngest case..... 4 days old
Maximum incidence..... 5th month
11 cases over 10 years of age.

The typical signs and symptoms of intussusception are characterized by (1) sudden onset,

*From the Surgical Service of the Hospital for Sick Children, Toronto.

(2) signs of pain (crying, writhing, drawing up legs), (3) vomiting, (4) blood in stools which is usually of mucoid or jelly-like consistency, (5) refusal of feedings, (6) mass in abdomen which is often sausage-shaped, and which, in well-advanced cases, may be palpated per rectum. The child shows signs of shock with pallor, slight cyanosis, rapid respirations and listlessness. In late cases these signs persist and to them are added the signs of intestinal obstruction and/or peritonitis. Many cases, however, will not show a typical history. The only story the mother may give is that the child will not eat, vomited once, and may have had no stool that day. Careful examination may reveal a mass, either by abdominal or rectal examination, with frequently blood on the examining finger. If there is doubt there should be no hesitation in giving a barium enema. There is another group of atypical cases that we have seen fairly frequently. Many fatal cases came into hospital with an apparent gastro-enteritis, and were treated as such until too late. Whether these are primarily cases of intussusception with incomplete obstruction and diarrhœa, or cases of gastro-enteritis that develop an intussusception due to hyperperistalsis we cannot say.

An analysis of the incidence of symptoms showed 90% with vomiting, 87% with sudden onset, 85% with bleeding, 84% with mass, 96% with either bleeding or mass.

The incidence of recurrence was 10 cases out of the 575, seven of which were single recurrences. Three cases recurred more than once: one twice, one three and one four times. The percentage incidence was 1.7%. Recurrences may be associated with initiating pathology (Meckel's diverticulum, bowel tumour, etc.) not removed at first operation. All these recurrences were late, that is several weeks or months postoperatively. Recurrences in the immediate postoperative period do not occur.

Reduction without operation was accomplished in 12 cases, 4 reduced with diagnostic enema. Eight at operation were found to have œdema in the ileo-cæcal region indicating spontaneous reduction. Meckel's diverticulum was recorded in 25 out of 566 cases operated upon and in most of these formed the apex of either an ileo-ileal or ileo-colic intussusception. If one is found it should be removed.

The incidence of various types of intussusception is recorded in Table IV.

The ileocæcal type is the commonest. Of the three types, ileocæcal, ileocolic and ileal, the ileocolic and ileal have a much higher mortality rate. A feature seen at operation in many of the ileocæcal intussusceptions is a small persistent dimple on the anterior superior aspect of the terminal inch of ileum. This is seen and persists after reduction.

Routine appendectomy with operative reduction of the intussusception is condemned. Two cases in this series came to autopsy having died from peritonitis due to a leak through an appendiceal stump. If appendectomy seems necessary due to gangrene of the appendix a silk

TABLE III.

MORTALITY IN RELATION TO DURATION OF SYMPTOMS

Duration of symptoms	*Entire series (1916-1950)*			*Current series (1940-1950)*		
	No. of cases	*Deaths*	*Mortality*	*No. of cases*	*Deaths*	*Mortality*
Under 24 hours	262	10	3.8	105	0	0
Under 48 hours	123	21	17.0	38	1	2.6
Under 72 hours	75	25	33.0	26	1	3.8
Over 72 hours	88	43	49.0	31	8	25.8

TABLE IV.

INCIDENCE OF DIFFERENT TYPES OF INTUSSUSCEPTION

Type	*Ileocæcal*	*Ileocolic*	*Ileal*	*Colic*	*Compound*	*Multiple*	*Chronic*
Cases	343	90	35	8	24	4	2
% incidence	67.6	17.8	6.94	1.6	4.7	0.78	0.39
Mortality	41	18	9	0	5	0	0
% mortality	11.9	20.0	25.7	0	28.3	0	0

In addition there was one reported case of intussusception of ileum into a patent vitello-intestinal duct.

intestinal purse string suture should be used reinforcing the inverted area with two or three Lembert type of silk sutures.

The most gratifying feature about all bowel surgery in the last ten years has been the striking reduction in mortality rates. This is well seen in cases of intussusception that required resection. In Group I cases (1915-29) there were 26 resections, only 3 of which were successful. The resection mortality rate in this group was 88.5%.

In Tables V and VI the resections for Group II (1930-39) and Group III (1940-50) are considered.

TABLE V.

RESECTIONS 1930 - 1939

Type	*No. of cases*	*Cured*	*Died*
Exteriorization	1		1
Ileum (side-side)	1		1
(end-end)	4	1	3
Ileum (undetermined)	1		1
Ileo-ascending	3		3
Ileo-transverse	1	1	
Total	11	2	9

Mortality rate 81.8%.

Indications for resection are (1) Inability to reduce the intussusception; (2) Gangrene of the bowel wall; (3) Perforation of the bowel; (4) Bowel tumour (rare).

In Group III (1940-1950) there were 15 cases resected, and 2 cases where the bowel was exteriorized because the patient's condition did

TABLE VI.

RESECTIONS 1940 - 1950

Type	*No. of cases*	*Cured*	*Died*
Maunsell	1	1	
Exteriorization (ileo-colic)	3	1	2 (see above)
(ileum)	2	2	
Ileum (end-end)	4	4	
(side-side)	2	1	1
Ileo-transverse (side-side)	2	2	
(undetermined)	1	1	
Ileo-colic (where in colon not determined)	1	1	
Ileo-ascending	1		1
Total	17	13	4

Mortality rate 23.5%.

not permit of further operative procedure. Both of these died.

From the above reviews of resections in the three groups it is apparent that the most successful types of resection and anastomosis are the ileal and the ileo-transverse. In the entire series there is no record of a successful one stage ileo-ascending resection and anastomosis. The Mikulicz type of two stage exteriorization procedure has been successful in three cases, one of which was an ileo-ascending anastomosis. It has been unsuccessful in two others in the last ten years but these were cases where the patients were in an almost moribund state and exteriorization was performed as the least traumatic procedure. There would not seem to be any particular advantage in the Mikulicz type of procedure judging from these results alone. It is the procedure of choice where the patient's general condition is poor. In doing the ileal resection and anastomosis, the ends of bowel to be anastomosed should be transected obliquely with the greater length on the mesenteric side. This allows for anastomosis with less narrowing. Ileo-transverse anastomosis may be either end-end or end-side.

An analysis of the various causes of death in Group II (1930-1939) and Group III (1940-1950) is recorded in Table VII.

TABLE VII.

CAUSES OF DEATH IN INTUSSUSCEPTION

Cause of death	*Deaths (1930-1939)*	*Deaths (1940-1950)*
Peritonitis	11	3
Pneumonia	3	1
Shock and toxæmia	3	1
Toxæmia	7	3
Undetermined	2	1
Shock and peritonitis		1

It is readily seen that the chief causes of death are peritonitis, toxæmia and pneumonia. In short, bacterial infection has been the chief cause of death, if we consider toxæmia as at least partially bacterial in origin.

Now, why has the mortality rate been so markedly lowered in the last ten years? Some have attributed it to improved standardization of operative technique. Gross and Ware in their review of 610 cases attribute their recently improved results to using the two-stage Mikulicz type of procedure. This obviously is not a factor here. The introduction of the Wangensteen suction and later the Miller-Abbott tube with continued suction to decrease pre- and post-operative distension is the most important factor responsible for improvement in mortality figures.

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The Wangensteen suction and the Miller-Abbott tube did not come into common use in this hospital until 1939, as far as the treatment of intussusception was concerned. Previous to that drainage was obtained by gravity methods or intermittent aspiration by syringe. A better understanding of supportive therapy including blood transfusions, intravenous glucose, and saline has accounted for some of the improvement in mortality figures, but these factors seem to have been well appreciated in both the Group II (1930-1939) series and the Group III (1940-1950) series. They were less well understood in the Group I (1915-1929) series. Perforations, which were formerly treated by ileostomy or suture, are now considered an indication for resection. Standardization of technique with the discontinuance of anastomosis of ileum to ascending colon is of some importance.

The improvement in early diagnosis, in the last ten years 59% of cases in the first 24 hours, compared with 42% in all previous years, has helped to lower the mortality rate to some extent, and we can better treat and prevent pneumonia and streptococcal septicæmia, which complicated these cases in the earlier years of this series.

In addition to the above factors, the improved mortality rate in the past ten years has been influenced by the introduction of chemotherapy. The sulfa groups and later penicillin and streptomycin were used. In the Group III resections they were used in nearly all the cases surviving, actually in 11 out of 13. Of the four resections that died, two were simple exteriorization procedures performed on moribund patients, one was an ileo-ascending resection and anastomosis in which sulfathiazole was started postoperatively, and the last one was a resection of ileum with side-to-side anastomosis and in this case there was no chemotherapy until shortly before death, which was 24 hours postoperative. It would seem to be advisable from the clinical evidence above and from work on the experimental animal to give perhaps both penicillin and sulfa drugs to cases of well advanced intestinal obstruction, and to commence these on admission. They will combat toxæmia and will reduce ulceration and inflammation in the intestinal wall, and thereby promote healing of the anastomosis and prevent peritonitis.

SUMMARY

575 cases of intussusception have been reviewed, with an overall mortality rate in the period from 1940 to October 30, 1950, of 5.2%, which is a marked reduction compared with the mortality rates of 27.5% for the 1915 to 1929 period, and 17.6% for the 1930 to 1939 period. The mortality rate for resections has also been reduced in the last ten years from over 80 to 23.5%. The various factors responsible for this reduced mortality rate have been discussed and the most important are considered to be the introduction of continuous intestinal suction, maintaining fluid balance, and the introduction of chemotherapy. It is suggested that the mortality rate can be further reduced by using ileo-ileo anastomosis or ileo-transverse anastomosis in resections.

We have also shown that: (1) Intussusception is very rare under the age of three months. (2) There is no mortality in cases operated upon within 24 hours. (3) It is the physician's duty to exclude intussusception in any infant who refuses to eat or vomits over a period of several hours. Rectal blood or mass in the abdomen in such an infant should be sought for. The presence of diarrhœa does not exclude intussusception. (4) Older children with signs of intestinal obstruction may have an intussusception. It is commoner in older children than in infants under 3 months of age. (5) Intussusception should be considered in any infant that passes blood by rectum.

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The important points in the therapy of empyema in childhood are: early institution of adequate antibiotic therapy; repeated thorough evacuations of the affected pleural space by aspiration; and supportive measures, including transfusions, oxygen and maintenance of nutrition. If these measures are applied early, the percent of patients with empyema necessitating surgical drainage can be lowered and a satisfactory outcome may be expected in a large proportion. If trial with these methods in infections caused by antibiotic sensitive organisms does not yield satisfactory response within 2 weeks, consideration must then be given to surgical drainage.—J. A. Doucett, *U.S. Armed Forces Med. J.*, 1: 1419, 1950.

CONTINUOUS INFUSION OF DEMEROL DURING ANÆSTHESIA

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THE SEARCH FOR REMEDIES to relieve man's sufferings dates back to the days of unrecorded history. By far the most important of these remedies has proved to be opium, the juice of the poppy plant. Its first recorded use was found in the writings of a Greek by the name of Theophrastus in the third century B.C. Different pharmacological mixtures such as laudanum and paregoric were subsequently developed and widely used. However, not until 1805 was the chemically pure alkaloid morphine isolated and prepared by the German pharmacist Serturner. The discovery of other pure alkaloids such as codeine and papaverine soon followed.

As a knowledge of the chemistry of the alkaloids became more precise and the basis for their pharmacological actions understood, a search was conducted for synthetic compounds which would duplicate the more desirable properties and at the same time eliminate the more undesirable. Of these compounds, Demerol has proved of the most valuable.

Demerol or isonipicane (ethyl 1-methyl-4-phenylpiperidine-4-carboxylate) was first prepared by Eisleb and Schaumann[1] in 1939. Since its introduction it has enjoyed wide popularity due to its analgesic, antispasmodic and sedative properties. These attributes, together with the fact that it has proved to be a relatively non-toxic drug, would indicate its use as a valuable supplementary drug in the field of anæsthesia.

Morphine having proved its usefulness as a pre-anæsthetic drug, the first step was to substitute Demerol and prove it an adequate replacement. Rovenstine and Batterman[2] made an extensive study of its use in 1943. The general conclusions from this work were that Demerol: (1) Provides adequate psychic sedation. (2) Does not depress respiration to the same degree as morphine. (3) Is more effective in drying secretions than is morphine. (4) Will reduce the amount of anæsthetic agent required to produce adequate narcosis. (5) Will produce fewer side effects than morphine.

This being generally accepted by most observers, it seemed only logical that Demerol be used as a supplement during the anæsthetic procedure itself. In 1947 Neff, Mayer and Perales[3] reported on its use with nitrous oxide and curare. Demerol was given intravenously in divided doses after a nitrous oxide induction. A similar technique was employed and reported by Mushin and Rendell-Baker[4] in 1949, also by Brotman, Milton and Cullen[5] in the same year. Stephen and Pasquet[6] noted a marked decrease in the amount of Pentothal sodium required when used in conjunction with Demerol during certain neurosurgical procedures. This observation was confirmed by Brown[7] in his discussion of anæsthesia for transthoracic procedures.

The chief advantages derived from the use of intravenous Demerol would seem to be: (1) A rapid recovery from narcosis, the patient generally having awakened prior to leaving the operating room. (2) The diminution of postoperative pain and restlessness. (3) Relatively few post-anæsthetic complications. (4) Decrease in the amount of the anæsthetic agents, particularly barbiturates.

Pharmacologically, Demerol simulates the action of many other drugs. Centrally, it produces slight sedation and marked analgesia, ranging between morphine and codeine in its analgesic action. On respiration it has a depressant action, though definitely less so than morphine both in intensity of effect and duration of action. Its effect on circulation is slight except in large doses, when it produces a vasodilatation with a resultant fall in blood pressure. On the heart its action resembles that of quinidine, in depressing the excitability of the cardiac muscle. Robbins[8] in 1945 demonstrated this in experiments on dogs. In these, Demerol was shown to prevent cardiac irregularities produced by cyclopropane.

As an antispasmodic, Demerol simulates both atropine and papaverine. Simulating the former, it produces mydriasis, inhibits salivary secretion and has a weak antivagal action. In addition, it has a direct action on the smooth muscle of the bronchioles, intestine, uterus and blood vessels, producing relaxation as does papaverine. On the other hand, it has been shown to produce spasm of the biliary tract, where once again it resembles the action of morphine.

In addition to this, it has a local anæsthetic action. This was demonstrated by May[9] (1946) in tests on the rabbit's cornea, the frog's sciatic

nerve and on intradermal injections on man. The anæsthetic action was estimated to be about 70% of that of cocaine, but as it produces preliminary irritation it is unsuitable for clinical use.

Demerol is absorbed when given either orally or parenterally. It is mainly hydrolyzed in the liver, but up to 20% has been recovered in the urine and minute amounts have been recovered in the saliva.

In the technique to be described the patient is premedicated with Demerol and hyoscine subcutaneously one hour preoperatively. The dosage is regulated according to the age, physical status of the patient and surgical procedure. Morphine sulphate and barbiturates are also used, but it is felt they cause more respiratory depression during the course of the anæsthesia without providing any additional advantages.

Induction is performed generally with Pentothal sodium or Pentothal sodium and a curare-form drug. Nitrous oxide induction was also tried, but proved to be too time-consuming. Anæsthesia is continued using no less than 25% oxygen with nitrous oxide. This mixture is administered by a semi-closed technique. A Demerol drip is started immediately in dilutions of 0.02 or 0.04%. This is obtained by adding 100 to 200 mgm. of Demerol to 500 c.c. of 5% dextrose and water. No particular advantage is claimed for either dilution, but the more concentrated is often used for young patients of strong physique so that Demerol may be given without administering too much fluid; 20 to 40 mgm. Demerol are run in quickly, the subsequent rate being gauged according to the patient's requirements.

The method above described has been used in over 1,000 cases. From these it was found to have many advantages as well as some definite disadvantages. In moderate dosage there is little or no effect on the cardiovascular system. The blood pressure and pulse remain undisturbed unless large amounts of Demerol are given quickly in single doses. Where blood pressure fall was noted, in no case did it last longer than fifteen minutes before attaining its former level. An elevation in both pulse and blood pressure does occur sometimes and indicates a light plane of anæsthesia. The effect on respirations is definitely depressant. In many instances it has been necessary to assist the respirations and in others it has seemed advisable to control them. Hypoxia is never a problem with this technique if adequate oxygen is used and assistance given to respiration when required.

The light plane of anæsthesia does present a problem in both abdominal and thoracic surgery. Reflex straining and coughing occasionally occur. When such complications do appear, increasing the speed of the intravenous Demerol drop does not bring the patient quickly under control. Relatively large amounts of curarizing drugs and occasionally additional doses of Pentothal have been found necessary to provide relaxation and control these conditions.

The technique has proved most useful in neurosurgical procedures where non-explosive agents are required and where the cough reflex is such a hazard. Although pharmacologists state that Demerol does not depress the cough reflex, certainly where there is no direct stimulation, as occurs in thoracic surgery, the Demerol-nitrous oxide combination has proved more efficacious than other non-explosive mixtures in common use. In no case in our experience has control of the cough reflex become a major problem.

In operations of less than 30 minutes there would seem to be little advantage to this technique over one using Pentothal induction plus nitrous oxide maintenance. In longer cases, however, the Demerol-nitrous oxide combination provides more adequate analgesia with less residual depression than does the former combination, and we feel that the intravenous drip maintains a more even plane throughout.

At the termination of surgery there is relatively rapid return to consciousness and reflex control. Even in those patients where respirations have been controlled throughout a rapid return to spontaneous breathing is obtained by stimulation of laryngeal or carinal reflexes. Mental alertness soon follows, and the patient usually responds to questioning before leaving the operating room. Postoperatively, our observations confirm those of Mushin,[4] who noted marked pain relief with less restlessness. In few patients did postoperative nausea and vomiting prove troublesome. In one such patient, a postoperative fenestration, the upset might possibly be attributed to the operative procedure. In the others no explanation can be offered other than a sensitivity to the drug itself. In all patients where nausea and vomiting did occur, it lasted no longer than 24 hours. The even plane of anæsthesia, the remarkably quick recovery from

anæsthesia and the lack of any major post-operative complications constitute a formidable argument for the more widespread use of this technique.

A technique for the use of intravenous Demerol has been outlined. It may be used in conjunction with other agents to produce adequate anæsthesia for almost any surgical procedure. Particularly where deep prolonged muscle relaxation is not a predominant requisite.

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LEIOMYOSARCOMA OF THE STOMACH*

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LEIOMYOSARCOMA of the stomach is a rare lesion. The incidence of sarcoma as compared with carcinoma of the stomach is approximately 1:100 and only 1:10 of these is a leiomyosarcoma.[1] With improved diagnostic facilities we are recognizing more of these lesions in recent years as evidenced by the fact that of the total of 16 cases reported by the Mayo Clinic in the period 1907 to 1947, ten were recognized between 1940 and 1947. This thesis is supported by the findings of leiomyomata of the stomach in approximately 16% of routine autopsies, some of these having undergone malignant degeneration.[2] In the pathological laboratory of the University of Alberta Hospital and the Provincial Laboratory of Alberta there have been only two cases reported in a twenty-two year period.

PATHOLOGY

This type of neoplasm may appear as a submucosal, intramural, or subserosal lesion. Ulceration of the mucosa may occur in any of the three as it is present in approximately 50% of cases.[1] This accounts for the fact that hæmorrhage is probably the commonest symptom. In the 16 cases reported by Marvin and Walters 62% were classified according to Broder's classification as Grade 1 and 19% each as Grades 2 and 3 respectively.[1] Metastases seldom occur early and are usually less extensive than in carcinoma. Marvin and Walters report metastases in 12% of their cases whereas Pack and McNeer in a series of 9 cases reported metastases in 33%.[3]

CLINICAL PICTURE

The commonest symptom of leiomyosarcoma of the stomach is gastro-intestinal hæmorrhage which most often is massive in type. The only other symptom of importance is that of epigastric distress or pain. Nausea and vomiting are occasionally described in this lesion. Weight loss however, is a rare symptom. The only finding on physical examination in many cases is the presence of an abdominal mass in the left upper abdomen. Laboratory data may demonstrate anæmia and on routine gastric analysis free hydrochloric acid is usually present in contradistinction to the usual findings in gastric carcinoma. There is no unanimity of opinion as to the x-ray appearance of these lesions. Some observers maintain that there are no distinguishing features between these tumours and other gastric growths,[5] while other investigators claim a characteristic appearance of a rounded mass with smooth surface protruding into the stomach from a relatively broad base with an area of surface ulceration or the presence of a sinus tract being the feature pointing to the muscular origin of these tumours.[6] In the Mayo Clinic series no case was diagnosed preoperatively by x-ray examination. In one of our cases, Dr. Ewart Duggan made the diagnosis preoperatively. The treatment of these lesions is surgical and a very high percentage of them are resectable. Subtotal or total gastrectomy is the procedure of choice. The lesion is not radio-sensitive.

CASE 1

Mrs. N.K., age 51, was admitted to the University of Alberta Hospital on May 29, 1951 complaining of backache and a feeling of pressure in the lower abdomen

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which had been present for a long time but had been worse during several years previous to admission. She had suffered from irregular menses and in April 1951 spotted off and on continuously for a month. A diagnosis of multiple fibroids of the uterus was made and she was operated upon on May 31, 1951 by Dr. J. R. Vant. At operation a fibroid was enucleated from the posterior wall of the uterus and then a total hysterectomy was carried out with bilateral salpingo-oöphorectomy. The pathologist reported tuberculous endometritis and bilateral salpingitis and simple cyst of the right ovary. Her postoperative course was uneventful until her 11th postoperative day with the exception of a low grade fever. On her 11th postoperative day she fainted while eating breakfast and when she recovered complained of weakness and anorexia and appeared pale and weak. Hæmoglobin estimation later on this day was 5.2 gm. or 36% compared with an admission hæmoglobin of 12.6 gm. or 87%. Stool examination revealed occult blood. At 2 a.m. on June 12th she was found unconscious with a pale clammy cold skin, and a clinical diagnosis of massive gastro-intestinal hæmorrhage was made. Careful questioning and review of her previous history revealed no evidence of dyspepsia or passage of occult blood previous to her hospitalization. From June 12 to June 18 she received approximately 6,380 c.c. of blood and bleeding persisted. On June 19 her hæmoglobin was 6.0 gm. or 41%. June 20 she had a further 1,500 c.c. of blood and on June 21 x-ray of her stomach and duodenum was reported by Dr. Ewart Duggan as follows:

"Filling defect of the posterior portion of the greater curvature middle third of stomach. This is about half of the size of a tangerine orange. There is ulceration in the centre. It is most probably a leiomyoma or leiomyosarcoma."

She was seen by the surgical service on June 20 and laparotomy was advised. The operative report in part reads as follows (W. C. MacK.):

"On exploration of the stomach there appeared to be a polypoid ovoid tumour attached to the posterior wall. The stomach was opened and a cystic intramural lesion of the posterior wall was found with an ulcerated surface from which there was gross hæmorrhage—unquestionably the site of this woman's massive upper G.I. hæmorrhage. The lesion was removed quickly to control bleeding. Two rows of sutures were placed along the attachment of the tumour to the posterior wall with atraumatic running catgut, and then one row of interrupted silk sutures was used in the serosa of the posterior wall to support this closure. The longitudinal opening in the anterior wall was then closed transversely after adequate hæmostasis."

Postoperative diagnosis was "intramural tumour of the posterior wall of the stomach with an ulcerating surface and massive gastro-intestinal hæmorrhage".

The pathologist reported the tumour as follows: "The tumour was within the submucosa and enclosed in a thin fibrous capsule, highly pleomorphic spindle-shaped or stellate cells showing slight tendency to whorled arrangement. Multinucleate tumour giant cells are common. Mitoses are frequent. Many of the spindle cells have the morphology of smooth muscle cells. Sections through the ulcer show sharp interruption of the mucosa, the ulcer bed being formed by the necrotic tumour tissue. Diagnosis: leiomyosarcoma, stomach, with ulceration."

Following the first operation the blood picture rapidly improved and on June 28 her hæmoglobin was reported 11.5 gm. or 80%. Her only postoperative complication was a phlebitis in the right long saphenous vein attributed to a cut-down through which I.V. therapy had been administered. Anti-coagulant therapy and high protein high caloric diet resulted in an uneventful convalescence. She was discharged on June 28, 1951. She was readmitted on July 4, 1951 and a subtotal gastrectomy performed on July 7 with removal of the entire greater omentum. Palpation of the liver revealed no evidence of any metastatic lesion and no glands could be felt in the gland-bearing area of the stomach. Her postoperative course this time was uneventful and she was discharged on July 18, 1951 in satisfactory condition. When examined routinely eight months postoperatively she felt fine, had gained weight and had no evidence of hæmorrhage or other untoward symptoms.

CASE 2

Mr. J.J.H., 61 years old, was admitted to the University Hospital on May 19, 1947 complaining of a lump outside his anus for 1 year and anal itching and discharge (sero-sanguinous) for 6 months. He had no other complaints. His appetite was good, he had no weight loss nor had he any dyspepsia. His walking exercise was limited by anal pain, right arm exercise limited by traumatic arthritis originating in a gunshot wound dating from World War I. The anal ulcer and multiple peri-anal fistulæ with chronic inflammatory indurated lesion of the peri-anal and peri-rectal tissues were treated surgically and failed to heal. Colostomy was decided upon to defunction the distal colon in the hope that diversion of the fæcal stream would permit healing. At operation (Dr. M. E. Geissinger) palpation of the upper abdomen revealed a firm tumour 2" by 1½" of a slightly knobby nodulated surface glistening and bluish in colour but with several small cyst-like areas. Left side of the mass contained multiple yellow areas suggesting fat. The tumour originated from the anterior wall of the stomach at the lesser curvature and was attached by a wide base which appeared to spring from the wall but not to protrude into the cavity of the stomach. No adenopathy was encountered. The mass was excised along with the attached portion of the anterior stomach wall. The gastric mucosa underlying the tumour was normal. The stomach was closed transversely with two rows of continuous catgut reinforced with interrupted silk. A sigmoid loop colostomy was established in the lower left quadrant.

Pathologist reported as follows: "On section the greater portion of the tumour is composed of a cystic cavity containing thin brownish fluid and shreds of fibrin. At one side of the cyst there is a solid grey portion 4.5 x 4.5 x 2.5 cm. This tissue is moderately firm, homogeneous and vascular. It seems to be arising from the outer coats of the stomach. Microscopic section shows the solid part to be composed of interlacing bundles of spindle-shaped cells resembling smooth muscle. In some areas the tumour cells are swollen, œdematous and show irregularity in size and shape of nuclei and the presence of an occasional mitotic figure. Diagnosis: Leiomyoma with probable early sarcomatous change—stomach."

His postoperative course was uneventful and he was discharged improved with a functioning colostomy on November 25, 1947. He died December 28, 1948 of acute alcoholic poisoning. At post mortem examination no recurrence or spread of the tumour was found.

DISCUSSION

The prognosis in leiomyosarcoma of the stomach is better than in carcinoma of the stomach. Pack and McNeer feel that the untreated patient has a life expectancy of approximately 18 months.[3] With surgical therapy instituted early, the prognosis is significantly improved. In the Mayo Clinic series 50% of their patients lived longer than 20 months and one was living and well after 7 years.[1] In our cases, one case was entirely asymptomatic and probably the subserosal location of the tumour accounts for the lack of symptoms and explains the lesion as an incidental finding. In our other case massive gastro-intestinal hæmorrhage was the predominant symptom, sudden in character, with no previous G.I. symptoms to indicate the

presence of an upper G.I. lesion. The x-ray diagnosis of leiomyosarcoma is seldom made preoperatively. While it is much too early to claim cure in either of these cases, the fact remains that one year and one month following operation when one of our patients died from another cause, no evidence of residual tumour was found. In the other case one year following operation the patient is living and well with no evidence of recurrence. It would appear that it would be difficult to make the diagnosis of leiomyosarcoma of the stomach with any degree of certainty in a large percentage of cases. However, the diagnosis can be made preoperatively by the roentgenologist with careful study in some cases as exemplified by Case 1. The treatment of this lesion is surgical. A wide resection of the involved portion of the stomach offers the best chance of the patient being well in the future.

SUMMARY

1. Two cases of leiomyosarcoma of the stomach are reported with a brief review of the literature.

2. In the consideration of sudden massive upper gastro-intestinal hæmorrhage which fails to respond in any way to conservative therapy, this lesion should not be overlooked.

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HICCUP

A ten year review of anatomy, etiology, and treatment

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PAST MEDICAL LITERATURE provides few references to the etiology and treatment of this interesting malady. A study of efforts made to define and classify its causative factors terminates in the conclusion that most of the findings and attendant conclusions cannot be justified in the light of modern advance. Charles Mayo[1] in one of the early published articles on the etiology of hiccup frankly admits the dearth of information on the subject. His classification, based upon the established anatomy and physiology of the day, remains the one clearly cut effort extant. Excellent though it is, it fails to satisfy the demands of present day investigation. Soviet Union researchers,[2] basing their conclusions upon a misconception of the mechanics of hiccup, fail to show any appreciable advance in the knowledge of fundamental causation. Hamelin,[3] in his description of hiccup as a rhythmical, clonic contraction of the diaphragm gives far too broad an explanation to be of assistance in building an understandable classification of the malady. Remaining publications on the subject concern themselves mainly with modes of treatment, with scant effort at enquiry into etiology or pathology.

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ANATOMY

In view of findings in the actual mechanics of the hiccup spasm, a study of all anatomical structures involved must form a basis for any true pattern of its etiology. The modern concept of phrenic and sympathetic nerve anatomy becomes an integral part of the consideration of the diaphragm as a whole. Kuntz,[4] in his able work in the sympathetic field, describes hiccup as an involuntary reflex, respiratory in nature, and purely automatic. We believe the respiratory manifestations of the spasm to be secondary to initial muscular contraction. He also quotes Regelsberger's comments on the part played by the sympathetic system. Regelsberger,[5] however, makes little mention of sympathetic influence in hiccup, and disregards other sources of motor innervation to the muscular origins of the diaphragm. Kuntz,[4] also states that the existence of a special centre in the brain which mediates the hiccup phenomenon, is improbable. Though, with present knowledge this may be true, experience in this series leads us to believe that the combined action of the respiratory and phrenic centres, together with the hypothalamic sympathetic centres, may actually perform the work of a specific centre. Cases mentioned in case histories below tend to strengthen this belief

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in that the causative factor in the attacks occurred directly in brain tissue.

It is unfortunate that so important an anatomical structure as the diaphragm does not appear to have attracted any sustained attention in the overall picture of modern anatomic advance. Through the years the basic description of this muscle follows a set pattern in edition after edition of standard text books. Goetz,[6] Kuntz,[4] Smithwick and White,[7] Mandl *et al.*,[8] have in their recent publications provided an incentive for further intensive research in this direction. Present descriptions lead one to believe that the diaphragm is a predominantly tendinous organ. Repeated dissections show a preponderance of muscular tissue in almost 70% of its wide circumferential bases of origin. The central tendon —so-called—is not a tendon and is not central. Musculo-fibrous bundles are found throughout its entire extent. It is situated posterior to the dome centre and always a little lateral to the mid line. The fibres of this so-called tendon do not converge into a central core but run through its whole area without any set pattern. Surgeons experienced in diaphragmatic surgery have long recognized the difficulty of obtaining a straight line cleavage of this part of the diaphragm. Consideration of the tremendously wide areas of origin, extending from the ziphoid process anteriorly, through the whole extent of the lower thoracic cage to the upper three lumbar vertebræ impresses the dissector with the large amount of purely muscular tissue found.

The actual innervation of these peripheral areas assumes importance in the study of mechanics of the hiccup spasm. Two areas in particular, in view of the powerful part they play in diaphragmatic movement, must be considered: (1) The area of interdigitation between the lower costal bundles and those of the transversus abdominis muscles. These areas are innervated by branches of the anterior branches of the lower three thoracic nerves. Scant evidence can be found of phrenico-sympathetic nerve supply to these bundles. (2) The crura. These, without doubt form the most powerful origins of the diaphragm. Only the medial portions of these elongated, thick muscular bundles, and the supporting medial and lateral arcuate ligaments are entirely fibrous. Both Cunningham and Callander[10] make mention of the fact that the crura may be innervated by the lower thoracic nerves. We have found that whereas phrenic and sympathetic supply to the crura is very limited, branches from the lower two thoracic and upper two lumbar nerves are very numerous. Thus we can no longer consider the phrenic nerve as the paramount innervating force of the diaphragm as a whole. These differences in the innervation of the central and outlying portions of the diaphragm form a definite basis of explanation of the varying types of hiccup contractures that will be outlined later.

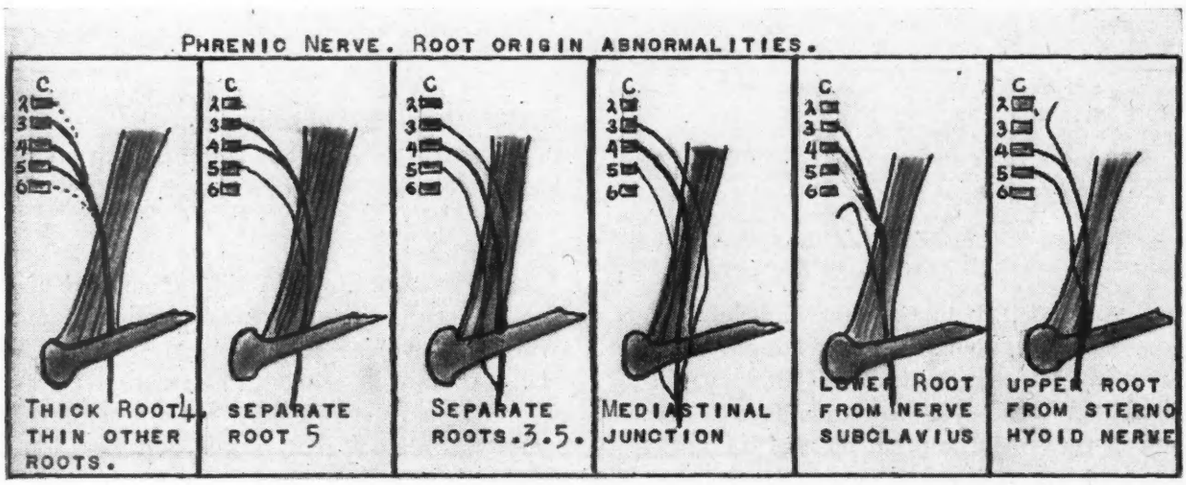

Fig. 1

In order to facilitate etiological classification, the phrenic nerve and its sympathetic connections will be considered in two sections:

Cervical and mediastinal section.—A newer concept of phrenic nerve anatomy readily supplies the answer to many of the problems of the etiology, mechanics, and treatment of hiccup spasm (Fig. 1). The bare statement found in text book anatomies, that the nerve arises from cervical 3, 4, and 5 is only partially correct. Cunningham,[9] conscious of the fact that abnormalities are frequent, states: "The nerve is derived mainly from the fourth cervical, reinforced by roots through from the

third cervical (either directly or through the nerve to the sterno-hyoid), and fifth, either directly or through the nerve to the subclavius". He further states that abnormalities in the formation of the nerve are found in 20 to 30% of dissections. Callander,[10] agrees as to the existence of an accessory phrenic nerve in the same percentage. Thorek,[11] in his admirable surgical treatise describes communications between the phrenic and the vagus, superior and inferior cervical sympathetic ganglia, the spinal accessory and hypoglossal nerves. He agrees with the previous authors as to the percentage of accessory phrenics found, and states that one can be reasonably certain that all connections with the main trunk are severed if 15 cm. of the trunk are removed. Although this is not recommended or thought necessary at any time, it is a far cry indeed from simple phrenic crush as a means of stopping all phrenic innervation (See operative technique below).

Further study amply demonstrates these and other abnormalities. Branches may arise from cervical 2 and 6. The branch from cervical 5 often remains as a separate fine nerve which does not rejoin the main trunk for varying distances extending to the superior mediastinum. It is usually found medial to the main trunk and must not be confused with the sympathetic chain. A thick root from cervical 4 and a fine root from cervical 3 may be found separate to any level in the neck. The author has twice encountered this abnormality during operative procedure. Though the possibilities of failure of simple phrenic crush must be apparent with the known percentage of abnormal phrenic trunk formation, this does not by any means, complete the picture.

In addition to references made by Thorek above, Kirgis and Kuntz,[12] Siwe,[13] Heinbecker and Bishop, *et al.*[14] furnish a detailed account of a series of intercommunicating fibres between the phrenic, vagus and sympathetic chains in the cervical region. Funaoka,[15] states that these communicating strands are found to be more numerous on the right side, and that on many occasions he has failed to find vagal communication fibres on the left. With reference to this finding it is curious to note that the great majority of hiccup spasms are unilateral and confined to the left diaphragm. Though it is not now possible to discuss the presence of sensory fibres in the vagus and sympathetic trunk, such an eventuality must be considered in the overall picture of etiology and treatment. Some of the above authors mention the possibility of some of these communicating fibres leaving the phrenic nerve for the sympathetic and vagus trunks and rejoining the parent nerve at a lower level. The name cervical phrenic circle has been applied to the above anatomic findings.

Abdominal section.—Cunningham[9] states that the phrenic nerve is the main motor nerve of the diaphragm, and that there may be some innervation from the lower thoracic nerves. He makes note of the fact that upon reaching the diaphragm the phrenic divides into many branches, the majority of which terminate in the subperitoneal areas. The structure and complexity of what is now known as the diaphragmatic plexus receives scant attention from this and other anatomic authors. This dense intricate plexus is concentrated in the central area of the diaphragm and thins out rapidly as it approaches the peripheral areas. It is formed by the phrenic subperitoneal branches and sympathetic branches which have their origin mainly in the cœliac plexuses. The main mass of sympathetic supply extends along the inferior phrenic artery to the under surface of the diaphragm. Numerous branches from the aortico-renal, splenic and hepatic plexuses also join in the formation. Its composite fibrils are so fine as to make it impossible to differentiate phrenic and sympathetic components, except under the microscope with differential silver nitrate staining. Numerous communications with the vagus have been described by the above authors, but their place in this study remains obscure. To this date we have failed to find reports on the proportions of phrenic and sympathetic supply in the plexus similar to that reported by Nettleship,[21] in his research on the coronary vessel innervation.

FLUOROSCOPIC DATA IN HICCUP

Routine repeated fluoroscopic examination of patients during this series has resulted in an orderly classification of events at varying intervals during the attack. Hiccup can no longer be described as a rhythmical, clonic contraction of the diaphragm as a whole. Though there is a slight divergence in a small number of cases, the majority present a definite pattern picture which may be classified as follows:

1. A single complete unilateral contraction of the whole diaphragm.
2. A single complete spasm followed by one to three smaller spasms in quick succession.
3. Contraction of one or more segments of the diaphragm, all unilateral, without complete spasm.
4. Unilateral complete spasm with segmental spasm of the opposite side.
5. Complete bilateral spasm, which may or may not be followed by smaller spasms. This type is rarely seen.

Interval fluoroscopy during the course of attacks presents a series of changes in the spasm picture. Timing of this changing sequence depends upon the severity of the attack and the condition of the patient. These changes have been observed to occur at a much more rapid rate in debilitated and exhausted patients. The importance of the differences in innervation noted above becomes self-evident in a study of this changing spasm sequence (Fig. 2).

1. A sharp pyramid like contraction of the whole diaphragmatic dome. The apex of the pyramid is always lateral to the mid line. This may continue throughout the attack.
2. A gradual flattening of the apical angle of the pyramid occurring from the fifth to the eighth day of the attack. At this stage wavy contractions of the outer segments of the diaphragm appear.
3. The pyramid is replaced by wavy contractions of the whole dome. These contractions first appear in the costal segments and proceed centrally.
4. Complete flattening of the whole dome with wavy contractions of the outer segments. This occurs late in the attack and is of grave import.

The above constitute a definite picture of progressive muscular exhaustion with gradual failure of muscular contractility.

ETIOLOGY

Based upon all the above findings, etiological classification of the causative factors in hiccup, though still presenting a complex problem, becomes much less formidable. Mayo's contribution has been discussed above. Noble Clark,[16] approaches the problem schematically, omitting the factual intermixture of many of the causative factors. His findings present a springboard for effective classification, but fail to evaluate the sequelæ in the prolonged hiccup attack. Re-

peated mention must be made of the fact that psychogenic influence plays a great part in all but very few of the cases presenting. Even in the presence of definite causative disease, the psychogenic status of the patient must be thoroughly investigated. Our experience with these cases forced the conclusion that the severity and length of the attack depend in a direct ratio upon the psychogenic make up of the patient. Minor transient attacks are not listed.

Over a period of years, by far the greater number of cases presenting fall in the psychogenic classification. Careful enquiry and observation soon eliminate the out-and-out malingerer. Border line mental cases present a great deal of difficulty, but eventually diagnose themselves.

debilitation and emaciation of the prolonged hiccup sufferer pose a serious problem. It must be remembered that hiccup spasms may occur from forty to one hundred times per minute, and in the prolonged attack occur during sleep and even under anæsthesia. The term cerebral cortex pattern has been used in the psychiatric field as applied to these advanced cases. Though no proof can be presented in refutation of a cortical pattern, we prefer to believe that the cycle is much more likely to be centred in the hypothalamic and medullary respiratory centres. Knowledge of cortical hypothalamic pathways is at present too obscure to be of assistance in this problem, although the findings of Kuntz,[4] and Goetz,[6] pave the way for future investigation.

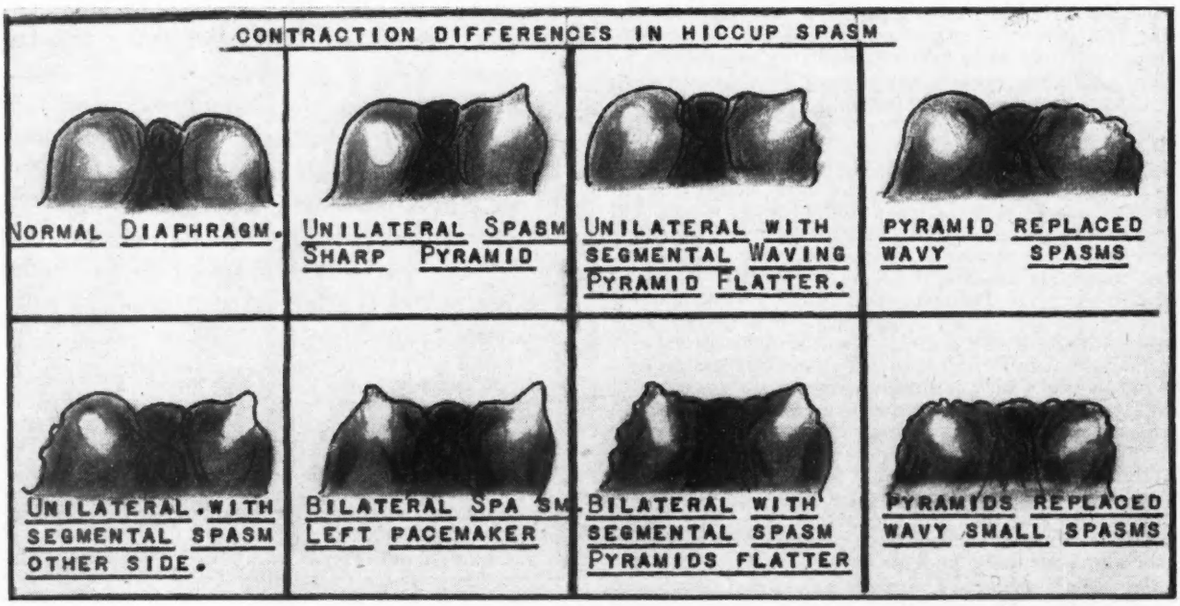

Fig. 2

The remaining patients in the psychogenic section fall into two main classes: (1) Nervous debilitated persons who have received a recent acute mental shock, or who have been under continued severe mental strain. In two of the present cases knowledge of proved sterility in one partner, discovered two years after marriage, preceded by only a short period, a prolonged attack. (2) Patients of neurotic tendency who have long complained of minor stomach or other digestive disturbances, for which no organic basis has been found. Cardiospasm and pylorospasm fall within this category.

Dope addiction has presented a small number of cases. Attacks in these cases ceased when withdrawal treatment was instituted. Extreme

TABLE I.

ETIOLOGICAL CLASSIFICATION OF PROLONGED HICCUP

Psychogenic	
Malingerers. Publicity seekers. Border line mental cases.	Mental shock. Prolonged Nervous Strain. Post partum. Cardiospasm. Pylorospasm.

To be considered in all cases with organic basis.

Organic			
Central nervous system	*Neck*	*Thorax*	*Abdomen*
Hemorrhage*	Tumours*	Aneurysm	Post-Oper/ve.
Thrombosis*	Glands	Neuroma*	Aneurysm*
Brain injury*	Aneurysm*	Tumour	Tumour
Fracture skull*	Branchial cyst	Pericarditis*	Gall bladder
Neurosyphilis*	Diverticulum	Pneumonia	Pancreatitis
Anæsthesia	Scal. Ant. Synd.	Abscess	Abscess*
Encephalitis	Arteriovenous aneurysm*	Diaph. hernia*	Ulcer
		Foreign body	Gastritis*
		Coron. thromb/s.	Foreign body*

*Cases occurring during this series.

DIAGNOSIS

The unusual classification into neck, thorax and abdomen shown in the etiological table above, is purposeful in that it covers the entire extent of the phrenic nerve, and assists materially in the elimination process leading to a diagnosis. We can all bring to mind articles published in both medical and lay press, commenting on the simplicity of phrenic crush and its use in the treatment of hiccup. Unequiyocally, it must be stressed at this juncture that phrenic crush or section *per se* is not the panacea for hiccup. Experts in the tubercular and other thoracic fields have long been cognizant of the many failures of phrenic crush or simple section in controlling diaphragmatic movement. Diagnosis of any hiccup seizure of prolonged duration, must of necessity be aimed at discovery of an underlying cause, if present. Careful enquiry should elicit: (1) Duration of attack and frequency of spasm. (2) History of previous attacks and duration. (3) Psychogenic status with especial attention to recent shocks or prolonged mental strain. (4) Organic factors. (5) Treatment administered prior to present examination. The latter is of great importance due to the large number of bizarre and sometimes dangerous treatments that may have been administered. In this series of cases we have seen: third degree burns in each posterior triangle of the neck following prolonged, repeated ethyl chloride spraying (Case 3 in case histories). Extreme dyspnœa necessitating use of respirator following procaine injection of both phrenics; amytal poisoning following ill advised recommendation of administration to the comatose stage; brachycardia with cardiac collapse following prolonged strong faradic stimulation to the neck.

Determination of the type and site of the spasm is arrived at by: (1) Visual inspection of the costal arches during spasm, under a strong light. (2) Fluoroscopic examination, repeated at suitable intervals. This gives better results when the patient can be examined in the erect position. (3) General appearance of the patient with regard to emaciation, etc. In late grave cases ecchymoses are found in the lower two intercostal spaces. Ecchymosis is much greater on the affected diaphragmatic side. This sign is an indication of dire import and demands immediate drastic treatment (see treatment). (4) Phrenic circle test.

The latter test, so incorrectly described by Gazan Dzalalov,[2] in the Soviet medical press, is claimed as a first in the successful treatment of hiccup. Though it is extremely useful in ascertaining the side of the spasm, or in bilateral cases, the pacemaker side, it has no place whatever in the further treatment of the attack. This is due to the fact that spasm returns almost immediately after the test is completed. We have used the test for many years and have never noticed remission of spasm for more than a few minutes. The test is performed in the following manner:

A small pillow is placed under the patient's neck producing a slight anterior arching. The first two fingers of the right hand are placed at the posterior border of the sternomastoid muscle immediately above its clavicular insertion. The fingers are pushed medially and posteriorly at an angle of thirty degrees until the resistance of the scalenes and the transverse cervical processes can be felt. Pressure is then made directly posteriorly by bending the terminal phalanges. Pressure should be gentle and steady and should not exceed two minutes. Spasm usually ceases on the pressure side within one minute of the application. Testing one side after the other simplifies the determination of uni- or bilateral spasm. Where bilateral spasm is found, in all cases seen, spasm is observed to be greater on one side than the other. This has been termed the pace-maker side. Treatment should be directed only to this side. We have found that successful treatment of the pacemaker side, (where surgical treatment has been decided upon), is followed by subsidence of spasm of the opposite side. Bilateral cases are however, rare.

TABLE II.

CASE STATISTICS

Unilat.	*Bilat.*	*Etiology*	*Duration*	*Male*	*Female*	*Findings*
15	4	No pathology	7-60 dys.	2	12	Psychogenic*
4	1	Slight "	6-27 dys.	2	3	"
4	2	Postoper/ve	3-8 dys.	5	1	Abscess 2 Obstruction 2 Perforation 2
1	0	Organic	36 dys.	1	0	Neurofibroma phrenic nerve*
4	0	Organic Brain. Skull	5-23 dys.	4	0	Hæmorrhage* Tumour. Injury* Fracture*
1	0	Organic Aorta	26 dys.	1	0	Aneurysm following wiring*
0	1	Organic Stomach	13 dys.	0	1	Swallowed foreign body
1	0	Organic	15 dys.	1	0	Neurosyphilis controlled*
0	2	Organic	5-9 dys.	0	2	Scalenus Ant. Syndrome
0	2	Post partum	6-22 dys.	0	2	Psychogenic*

*Cases described in case histories below. Total cases 42.

TREATMENT

Any mode of treatment must be based upon a careful evaluation of all factors concerned. Study of the statistical chart above emphasizes the fact that most cases are of long duration. It is important to remember that a history of all

treatments administered should be obtained before instituting any further therapeusis. We cannot stress too strongly that early rushing into surgical intervention is far from the intent or purpose of this present article. Every therapeutic aid recommended should be tried, and in some cases repeated, and one must be constantly alert for any etiological factor that may have been missed in earlier examinations. Only when all advances have failed, and the rapid deterioration of the patient becomes of grave concern, is surgical intervention advised. Debilitation and emaciation should, however, not be allowed to proceed to the stage where any type of surgical shock may have dire results. The advent of antibiotics has drastically reduced the number of postoperative cases seen. Where postoperative hiccup does occur, the pathological basis must be sought for and eliminated. We do not agree with Noble Clark,[17] that hiccups occurring after the third postoperative day are of grave import. A brief discussion of published treatments is of value in determining the therapeutic *modus operandi* of the first days of the attack. Should these and other measures fail, treatments indicated below should be instituted without delay, in an effort to forestall the rapid deterioration of the patient which sets in after this period.

Benzedrine sulphate.—Shaine Marks[17] quotes results in a small number of cases, all of which were postoperative and of short duration. Trial of this drug in other types of attacks has proved ineffective. Not recommended.

Quinidine sulphate.—Bellet and Nadler[18] report a number of cardiovascular and uræmic patients, a percentage of whom appear to have been *in extremis*. The dosage of the drug appears frequent and large. Information from the cardiological point of view is that in many cases this may be dangerous dosage. Ineffective in prolonged cases.

Carbon dioxide and oxygen. — Hamilton Bailey.[19] Administration of these gases has proved of definite value in the early treatment of hiccup. It has not proved helpful in later cases and in our opinion should only be used in the first three days. It is strongly advised (following some unfortunate sequelæ in injudicious use) that this be administered by a competent anæsthetist. Periods of inhalation should not exceed ten minutes. It is not recommended in extremely debilitated or emaciated patients. Open phrenic nerve injection as recommended by this author, has proved of doubtful and only temporary value. Bilateral injection should never be performed.

Barbiturates.—Many authors strongly recommend the use of this drug. Though it has proved extremely useful in early cases, excessive dosage and its use in late hiccup is to be discouraged. The recommendation of one author to push this drug to the comatose stage needs no further comment.

Galvanic sinusoidal current.—Barnard.[20] The application of galvanic current as outlined by this author, has, in his hands, met with success in a limited number of cases. Those who, in the wave of enthusiasm that followed his publication, have tried this procedure have been disappointed in its results. There is no doubt, however, that repeated applications in the early stage will in a considerable number of cases slow down the rate of hiccup. In the later stages of the attack the application becomes intolerable to an already debilitated patient, and has shown little if any effect.

Ethyl chloride spray.—Though still recommended by some, this treatment is completely useless. Sad results of prolonged spraying of both sides of the neck are described in Case 3 in our case histories below.

Psychiatric treatment. — Hypnosis has been recommended and tried. There are no reported sucesses. Except where there is a question of actual mental disease, consultation can give little assistance in the acute phase.

Deep anæsthesia.—Tried on numerous occasions. Completely useless and not recommended.

Space does not permit mention of the hundreds of varied treatments suggested and tried without any success.

Cases seen early in the attack should be placed on the following regimen: (1) Complete restriction of oral feeding or drinking. (2) Intravenous saline and glucose up to a maximum of 3,500 c.c. in 24 hours. Protein and vitamin therapy where indicated. (3) Thorough bowel cleaning by S.S.E. (4) Absolute visitor restriction. (5) Complete laboratory check. (6) Sodium amytal gr. 3, q.4 h. for 24 hours only. (7) Fluoroscopy once during the first day.

The above should be carried out for 24 hours. If hiccup is relieved or slowed down, continue with intravenous fluids for another 24 hours without further medication. With no relief, continue intravenous fluids for a third 24 hours,

with demerol mgm. 100, q.6 h. Fluoroscopy is repeated during this period. Galvanic current is applied as per method of Barnard at intervals during this 24 hours. If the first three applications of the current show no results, application is discontinued. Carbon dioxide and oxygen, at intervals of at least three hours during the ensuing 24 hours, should be administered by a competent anæsthetist. Periods of inhalation must not exceed ten minutes.

With failure of all the above intravenous therapy is discontinued, and the patient placed upon a semi-soft diet. One or more of the above treatments are repeated. Surgical intervention should not be delayed after the seventh day. Experience has shown rapid deterioration of the patient after this period. Fluoroscopy, to evaluate any changes in the spasm picture, is of great assistance in formulating the extent of intervention that may be required. General supportive treatment is maintained throughout.

SURGICAL INTERVENTION

In considering the anatomical data given above, it becomes evident that any surgical intervention must encompass all sections of the anatomic picture. Therefore the plan of action must include the following succession of moves, any one of which may be successful in abating the attack, but in which it may become necessary for all to be carried out before cessation of the attack will occur. (1) phrenic circle interruption. (2) Sympathetic interruption. (3) Lower thoracic and upper lumbar nerve interruption.

Following an appreciable number of failures of phrenic crush or simple section to control spasm, we have devised a technique of complete phrenic dissection which has proved successful in 95% of cases. In a small number of cases, although the major spasms were relieved, segmental spasm of the peripheral diaphragmatic areas continued. Control of these segmental spasms was attained through 2 and 3 above.

PHRENIC DIVISION

The nerve is approached by an incision extending from the posterior border of the sternomastoid, two fingersbreadth above the sternoclavicular joint, for about two inches posteriorly. The main trunk is easily recognized on the anterior surface of the scalene muscle. A portion of the nerve is dissected free from the prevertebral fascia. A hook is passed beneath this portion and the nerve is gently lifted away from the muscle surface. Careful dissection is carried upwards until the cervical roots are exposed. Continuing gentle traction on the nerve trunk, dissection is then carried down to the clavicle level. During this dissection any abnormality in root formation becomes quickly discernible. Mention is repeated of an abnormal cervical 5 root, medial to the main trunk, which may extend to the superior mediastinum, and must be differentiated from the sympathetic chain. All cervical roots are now crushed. The majority of the small fibril-like communicating branches to the vagus and sympathetic chain will be found at the level of the superior and inferior cervical ganglions. These are cut or simply pulled away. Finally the main trunk is crushed at the lowest level seen. The wound is then closed without drainage.

The above procedure usually results in complete cessation of the hiccup spasm. In three of the more severe cases, although there were no noticeable or auditory signs, patients complained that they still felt they were hiccuping. Fluoroscopic examination revealed small segmental peripheral spasms. Procaine injection paravertebral, of thoracic ganglia 8 to 12, with injection of eleventh and twelfth thoracic effectively stopped these smaller spasms. Paravertebral sympathetic injection without phrenic dissection was tried in some of our cases. Though the frequency and severity of the spasm was reduced, we were not successful in obtaining complete cessation. Increasing the area of injection from thoracic 6 to thoracic 12 showed no improvement over the shorter injection. There have been no deaths in this series. Recurrences took place in five cases, one to three years after operation. The attacks, however, were mild and responded to ordinary treatment.

CASE HISTORIES

Cases here presented were selected because of wide differences in their etiological factor.

CASE 1

Miss A.M., white, female, age 19. Previous history negative. Length of attack 23 days. Spasms per minute 60. Weight 83 lb. Normal weight 125 lb. Condition on admission: pulse 120, respiration 30, temp. 99.4°. Examination negative except for slight fullness in left posterior triangle. Spasm, left unilateral. Patient states she had had slight hiccup attacks, lasting from an hour to a day during the past six months. Present attack started after a cold and has increased in intensity. Operation revealed a neurofibroma in the central cervical portion of the phrenic nerve. Removal resulted in complete cessation of the attack. Two years later, 1942, another severe attack developed lasting 52 days. Patient complained at this time of long continued pain in the left chest. Spasm, unilateral and left-sided. X-ray showed negative except for an olive shaped bulging of the left pericardium. In view of the previous history, thorax was opened, and a neurofibroma of the phrenic nerve, about the size of an olive, was found in the mid pericardial section of the phrenic nerve. This was removed with complete relief.

CASE 2

Mr. H.K. Ordained Rabbi. Age 34. Previous history negative. Married two years. Advised by his doctor to have semen examination because of failure of his wife to become pregnant. Two weeks after receiving a sterile

semen report, he began to hiccup. In spite of the spasm he continued with his duties for five days. Following this he was treated for fourteen days with most of the remedies outlined above. Temperature 100°, pulse 140, respiration too rapid and jerky to be counted. Spasm 50 per minute. Bilateral, with stronger contractions of the left diaphragm. Left phrenic dissection April 1948. Immediate cessation. No recurrence. Regular duties since discharge.

CASE 3

Mrs. B.F., age 25, white. Previous history negative except for constant fear of delivering an abnormal child. Two members of her immediate family had delivered hydrocephalic children. Delivery of a normal child two months previous to onset of hiccup attack. Patient admitted to another hospital seven days after attack commenced. Narcosis, deep anæsthesia and repeated sprays of ethyl chloride to each side of the neck. When seen 14 days after inception of attack, temp. 101°, pulse 140. Respirations too rapid and jerky to be counted. Weight 132 lb. Normal weight 158 lb. On each side of the neck there is a large deep grayish looking ulcer involving most of the posterior triangle. Hiccup spasm 60 per minute, bilateral with stronger contractions of the left diaphragm. Condition of patient very poor. Left phrenic dissection September 1948. Immediate cessation. No recurrence.

CASE 4

R.G., age 67, white male. Two months prior to admission had undergone wiring of an aneurysm of the abdominal aorta by acknowledged expert in this field. Hiccup spasm commenced three days after operation. Spasms were slight during next few days. Patient was readmitted to hospital one week after discharge because of increase in severity of attack. All recommended treatments were tried. On admission to our service—Temp. 98. Pulse 64. Respiration 22. Spasm rate, 45 per minute. Left unilateral. X-ray disclosed loose coil of wire in the region of the cœliac plexus. Because of poor condition and previous surgery, it was deemed inadvisable to attempt to remove wire. Sympathetic paravertebral block of thoracic 7 to 12 reduced rate of spasm to ten per minute. Phrenic dissection December 1951. Complete relief. Died 18 months later.

CASE 5

J.T., age 48, while male. Treated for syphilis twenty years ago. Treated for neurosyphilis up to ten years before attack. No symptoms for the past five years. Head of successful large business. Present attack started two weeks before examination. Admitted to hospital on neurological service. On the twelfth day he developed severe hæmatemesis. We have twice seen this complication and believe that this is due to rupture of the cardio-œsophageal veins, following œdema and engorgement due to the constant tension and pull of the diaphragm in spasm. On examination, temp. 99°, pulse 130, respiration 30. Patient critically ill. Rate of spasm 45 per minute. Visual fibrillary spasm in lower two left intercostal spaces. Spasm, left unilateral with small wavy spasm of right diaphragm. Wassermann negative. Argyll Robertson pupils otherwise no evident signs of neurosyphilis. Phrenic dissection followed by paravertebral sympathetic injection and injection of thoracic 11 and 12. Hæmatemesis ceased immediately after phrenic dissection. Discharged December 1951. No recurrence to date.

CASE 6

E.K., age 60. Practising physician in New York. 14 days previously patient was admitted for cerebral accident. Coma 48 hours. Recovery after third day good. Vertigo and changing areas of anæsthesia and paralysis led to diagnosis of mid brain hæmorrhage by medical service. Hiccup spasm commenced on eighth day following cerebral episode. During the ensuing 48 hours rate of spasm increased and patient began to go downhill rapidly. No treatment was given because of cerebral history. On examination; patient in poor condition. Weakness but no absolute paralysis of both legs and left arm. Anæsthetic areas in right leg and left arm. Spasm rate 45 per minute. Spasm, bilateral with stronger left contraction. Phrenic dissection slowed down spasm to ten per minute. Paravertebral block and thoracic nerve injection caused almost complete cessation except for small spasm in the outer segments of the left diaphragm. Intercostal injection repeated. Spasms controlled. Patient discharged December 1950. No recurrence. Has now resumed practice.

CASE 7

C.K., age 38, white male. Basal skull fracture, fracture maxilla and mandible sustained in automobile accident. Condition grave on admission but after stormy period making good recovery. On fourteenth day patient fully conscious, no paralysis. Marked diplopia. On eighteenth day hiccup attack began and increased in severity at a rapid pace. Because of skull fracture and possible brain injury, phrenic dissection under local anæsthesia. Complete cessation of all spasm. Discharged March 1949. No recurrence. Diplopia persisted for about eighteen months after discharge. No recurrence of hiccup. Phrenic dissection under local anæsthesia proved very difficult and is not recommended. Tugging on the nerve is badly tolerated.

SUMMARY

This article reviews the subject matter based upon a ten year study, embracing:

1. Fundamental advances in anatomical knowledge of muscle formation and innervation of the diaphragm.
2. Present day concept of phrenic nerve anatomy, and similar advances in the structure of sympathetic areas of distribution.
3. Mechanics of the hiccup spasm.
4. Etiological classification.
5. Statistics and case histories.
6. Suggested treatment and results.

My sincere thanks to Dr. D. R. Webster for his kindly assistance and suggestions in the formulating of this article; to Dr. Jack Nadler, Consultant to the V.A. for medical information, and to Dr. Peter B. Samuels for proof reading and correction.

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Canad. M. A. J.
Oct. 1952, vol. 67

INFANT MORTALITY AND THE SOCIAL SERVICES*

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IN SELECTING for my lecture a subject that would be within the scope both of this lectureship and of my knowledge and experience, I realized that my work had been among sick infants and children and decided therefore that I should like to talk about infant mortality and some of the factors, mainly social, which influence it. Social medicine is now coming to be regarded as a special field for study, distinct from public health and clinical medicine—in fact, another specialty. While disclaiming any specialized knowledge of it, I recognize that the impact of social conditions on the prevention and course of disease becomes greater with the passing of the years and this is especially true of pædiatrics and child health. Modern therapy, including improved hygiene, sulfonamides and the antibiotic remedies, has brought about a change in clinical medicine and in the outlook of the clinician; it now appears that as far as infant deaths are concerned, it is by the improvement of social conditions generally that future progress will be mainly achieved. The saving of infants' lives will be brought about not so much by new knowledge of disease and how to cure it as by a knowledge of health and how to maintain it.

By definition, infant mortality is the number of deaths occurring in the first year of life per 1,000 live births. Apart from its importance to pædiatricians, it is also regarded as "a broad reflection of the degree of civilization attained by any given community". (Titmuss, 1943). Much earlier (1909-10) Sir Arthur Newsholme regarded it as the most sensitive index we possess of the social welfare and sanitary administration of the community. In addition to the infant mortality we speak of the neonatal mortality, by which is meant the number of deaths per 1,000 live births in the first month of life. These neonatal deaths are considered separately because, as I hope to show later, they arise from a different set of circumstances than those of the remainder of the first year of life. Finally to present a complete picture of the infant deaths in a community one must also include stillbirths, as these are potential lives lost and it is often fortuitous whether the infant is born dead to be classed as a stillbirth or shows some signs of life to swell the neonatal deaths. This is the more important because the definition of stillbirth varies in different countries.

Since about the turn of the century the infant mortality has shown a steady fall in most of the civilized countries of the world, representing an enormous saving in life. The extent of the fall in England and Wales can be seen in Fig. 1. Taking

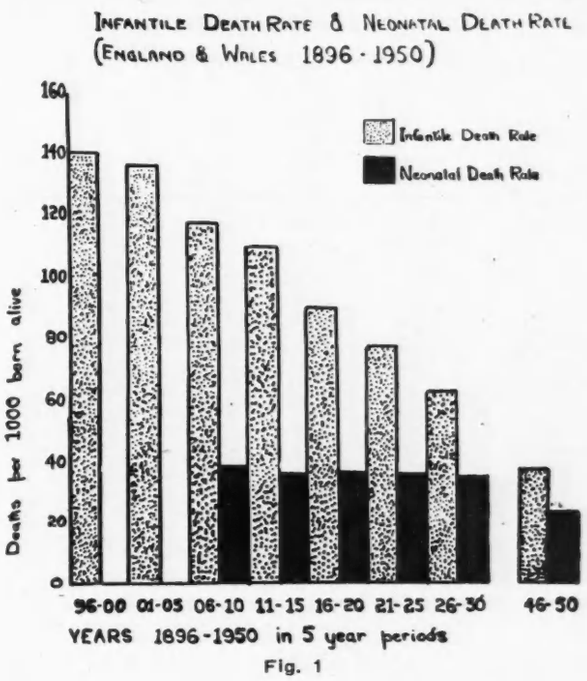

Fig. 1

the present day number of births in round figures for England and Wales to be 700,000 yearly, an infant mortality of 140 such as existed in 1900 would represent 98,000 deaths: in 1949 with an infant mortality of 32, the actual number of deaths would be only 22,400, a saving of nearly 76,000 lives annually. Even this would be an underestimation because the birth-rate in 1900 would probably be higher than in 1950. Holland, which had an infant mortality rate of 180 in 1896 to 1900, has had for several years a rate of less than 30, sharing with New Zealand and the Scandinavian countries the lowest rates in the world. The fall has been fairly steady throughout the years even during the war in belligerent countries such as Great Britain. Since then levels have been reached which in the period between the two world wars would have been regarded as phenomenally low (Table I).

*Based on the J. Vera Moberly Lecture delivered at the University of Toronto on October 17, 1951.

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On analysis of factors concerned, it is found that the fall in mortality has been brought about principally by the saving of life in the period from the end of the first month until the end of the first year—a period when infections such as infantile diarrhœa and pneumonia take their toll. These two major infections have to a large extent been robbed of their terrors perhaps to some extent by the use of sulfonamides and the antibiotics but not convincingly so. The fact that the onset of the fall preceded the discovery of sulfonamides by several decades would suggest the importance of recognizing other factors such as improved hygiene and a general awareness on the part of parents to the dangers of infection and the importance of maintaining good health. It is also to be remembered that this great increase in the survival rates occurred during a period when the incidence of babies fed at the breast was steadily falling.

TABLE I.

	England and Wales		*Scotland*	
	Infant mortality	*Neonatal mortality*	*Infant mortality*	*Neonatal mortality*
1939	51	28.3	68.5	36.6
1940	57	29.6	78.5	37.3
1941	60	29.0	82.7	39.9
1942	51	27.2	69.3	35.1
1943	49	25.2	65.2	32.9
1944	45	24.4	65.0	32.8
1945	46	24.8	56.2	28.5
1946	43	24.5	53.8	29.9
1947	41	22.7	55.8	28.5
1948	34	19.7	44.7	25.1
1949	32	——	41.4	23.2

(By courtesy of Registrar-General, Somerset House, London and Registrar-General for Scotland, St. Andrew's House, Edinburgh.)

When one comes to look at the neonatal mortality (Fig. 1), the situation is not so satisfactory. The fall in the neonatal rate has been slow: indeed it is only in the last two decades that much progress has been made and a point has now been reached when one cannot expect the infant mortality to fall much further unless there is a corresponding improvement in the neonatal deaths. In many countries, fewer than 10 infants per 1,000 born alive die between the end of the first month and the end of the first year. This suggests that the factors concerned with neonatal deaths are different from those causing death in the rest of the first year of life.

On further analysis of the deaths in the first month of life, one finds that infections which cause the majority of deaths later on are responsible for less than one-third. Dr. Agnes MacGregor (1943) has gone into this problem very carefully and in an analysis of 760 consecutive post mortem examinations classifies the causes of death into four main groups. In order of frequency they are infection (30%), intracranial hæmorrhage (29%), asphyxia (11.5%) and congenital abnormalities (11.5%); miscellaneous causes make up the other 10%. Of these four main causes the only one which can be favourably influenced at present is infection which is preventable and allows, in theory, a reduction of 30% in the neonatal mortality.

There is however, another important factor to be considered, namely, prematurity. Fifty per cent of the deaths in the first month occur in premature infants and while it is not satisfactory to regard prematurity as the actual cause of death, it is undoubtedly an important contributory factor. Infection, intracranial hæmorrhage and asphyxia are also more prone to occur in premature infants and the prevention of prematurity therefore becomes an urgent problem and concerns not only the pædiatrician but the obstetrician and the nutritional expert as well. It is on these small feeble infants that social factors exert their greatest influence. In "booked" maternity cases, that is where the mother has had adequate antenatal care, the premature birth rate is roughly one-quarter of the rate in the non-booked cases.

EFFECT OF SOCIAL CLASS ON INFANT DEATHS

I should like now to discuss the social factor and its influence on infant mortality. For such studies it is customary in Great Britain to divide the population into five social classes, according to the "occupational" classification used in the 1911 census and modified in 1921 and again in 1931. The classification is based on economic considerations and is fairly satisfactory for this purpose. Most children are born when their fathers are between 20 and 50 years of age when they are engaged in their life's work and their employment at the time reflects not only their social and economic status but also that of their children with a fair degree of accuracy. The five classes are as follows:

Class I Professional classes.
Class II Intermediate with border-line elements of I and III.
Class III Skilled labour.
Class IV Intermediate with border-line elements of III and V.
Class V Unskilled labour.

The effect of social class on infant mortality is shown in Fig. 2, constructed from data given by Titmuss (1943) and shows very clearly that the poorer the social and economic condition of the father, the greater is the infant mortality. Taking the figures for 1930 to 1932, if all the infants had belonged to Social Class I there would only have been 11 deaths per 1,000 live births from the end of the first month to the end of the first year: in Class V there were actually 44—four times as many as in Class I.

On the other hand, the neonatal deaths are not influenced to anything like the same extent by social class. This is as one would expect because as mentioned previously, these deaths are due to different factors. In 1930 to 1932 the neonatal death rate in Class I was 21.7 and in Class

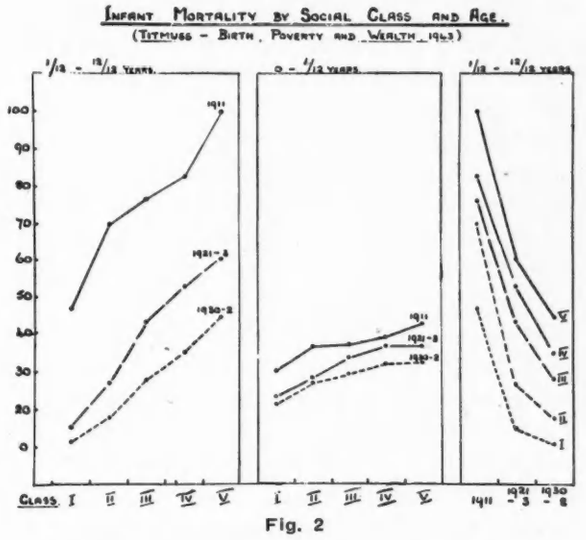


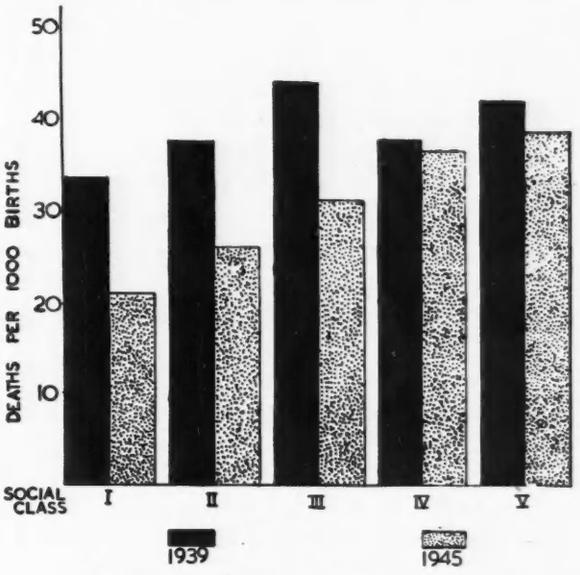
Fig. 2

V, 32.5, a relatively small increase compared to the fourfold one in the period from the end of the first month to the end of the first year.

It may be argued that the situation in 1951 is different from that in 1930 to 1932 but the same general trend exists. Douglas (1951) in discussing this question recently and using the data obtained from infants born in 1946, states "that if all the social classes had had the same mortality rate as the well-to-do, about 4,000 lives would have been saved in 1946 during the neonatal period and about 6,000 lives during the rest of the year"—a saving of 10,000 infant lives annually in England and Wales where the number of births is around 700,000 a year.

STILLBIRTHS AND SOCIAL CLASSES

In pursuing this problem further, I should like briefly to refer to stillbirths which as already stated must be included in any assessment of infant deaths. During the war years in Scotland the stillbirth rate, in common with the infant mortality and neonatal mortality, showed an appreciable fall—from 42 to 32. As stillbirths in Scotland have only been registrable since 1938 the previous trend is unknown but it is likely that the fall in the pre-war years was as great as in the war years. It seemed likely at first that this fall was in some way related to the improvement in the conditions of the masses of people during the war years, especially as regards diet. The spectre of unemployment had disappeared.



Stillbirth Rate by Social Class 1939 and 1945
[McKinlay 1948]

Fig. 3

There was a job for everyone and often the mother, attracted by the high wages in munition factories, worked as well, the children being looked after by a grandmother or in a day-nursery. Food was rationed and everyone got the same except for certain classes such as expectant mothers for whom extra milk, eggs and vitamins were provided.

One would have suspected that these factors would have had their greatest effect in Classes IV and V in causing the stillbirth rate to fall. Dr. Peter McKinlay (1948) however analyzed these figures and has shown very clearly that the improvement took place not in the poorer social classes but in the professional and skilled workers' families (Fig. 3). The explanation of this unexpected finding is difficult. On the whole, the diet of the well-to-do classes probably de-

teriorated during the war years while the diet of the poorer classes improved. Clearly diet was not the principal factor, or if it was, its advantages were offset by others such as the mother going out to work. Apparently stillbirths are not closely related to social factors or the health of the mother in the same way as are neonatal and infant mortality.

The point I have tried to make is that although great strides have been made in reducing infant mortality, the chances of an individual infant surviving are still mainly influenced by his social class. Here then is a challenge to those concerned with social progress—to raise the living conditions of all to the highest possible level so that the child of poor parents has as good a chance of survival as one born of well-to-do parents.

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THE PROBLEM OF ARTHRITIS IN INDUSTRY*

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THE TITLE OF THIS PAPER was chosen very carefully and its ambiguity retained purposely for several reasons: arthritis in relation to industry brings forth to our mind several problems or rather, must be considered as a multi-faceted subject that, we believe, should awaken much interest.

The literature on this debated issue is notoriously sparse in both the French and English publications: a rather astonishing fact when we consider the important and crucial rôle of arthritis as a cause of disability and invalidism in every country and particularly in Canada where statistics remind us that an army of 30,000 people are off work daily because of rheumatic diseases. Rheumatoid arthritis, this nefarious crippler, chooses 80% of its victims at the time of onset between the ages of 20 and 50, most productive years of life. The many-tentacled monster of arthritis is a nightmare not only for industrial physicians but also haunts all practitioners and the whole of the population of Canada. This situation will continue to exist until the more serious angles of this problem are finally rounded out by future discoveries in the difficult realm of rheumatism.

To this day, the physicians are faced with many question marks while caring for arthritics. Very often, the patient will bring up the possibility of trauma as an etiological factor in his arthritic lesions. On the other hand, the doctor will have to face too often the anguished question of his rheumatic patient: "When, where and how shall I be able to earn my living?" Unfortunately, all these questions will have to remain partially unanswered for the lack of interest we have shown, until today. Let us hope that we shall be able at least to stimulate interest in these problems and stress the need for extensive research in the many aspects of rheumatism and arthritis.

The first point pertains to whether industrial hazards can be held responsible for certain arthritic lesions. To my mind, this question can be answered in the affirmative. However, to use the words of Ferguson:[12] "It is notoriously difficult to differentiate between rheumatism and the less spectacular late results of trauma, sometimes wellnigh impossible".

In spite of this pessimistic view, I believe many a case can be found to illustrate our affirmation that trauma can be the cause of some forms of arthritis, although in one given instance it might often be difficult to ascertain the etiology. It is for instance a well-known fact that osteo-arthritis shows an especially high incidence in groups carrying a high proportion of injuries.[12]

A single acute trauma can be directly responsible for an acute traumatic arthritis, whether it be termed traumatic synovitis or hæmarthrosis[23] or acute traumatic arthritis proper, without effusion but with damage to the cartilage resulting in progressive articular lesion.[3] The distension due to effusion can be a prime factor in preventing healing of the cartilage and ligaments and is one of the greatest factors in producing an unstable joint, hypermobile cartilages and subsequent locking and damage.[23] We cannot accept

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Read before the Canadian Rheumatism Association at its annual meeting in Montreal, June 19, 1951.

the opinion of Gafafer[13] that fractures of the intra-articular type with lesion of the cartilage will rarely be a cause of arthritis: about only 4% of his cases. To our mind this percentage is far too low. These cases are usually sufficiently clear-cut, so that further discussion is not necessary.

On the other hand, the chronic type of traumatic arthritis or secondary osteo-arthritis presents a much more difficult problem. This form is due to repeated minor trauma or "minute forces applied internally or externally, so that no lesion, such as hæmorrhage, exudation, destruction of cells or necrosis, is immediately evident".[11] Secondary osteo-arthritis is more often due to direct trauma with damage to the cartilage: the scar, being then submitted to repeated motion, may produce the symptoms of this disease. This is particularly true of the knee joint where arthritis is hastened by overweight, overuse and the continued presence of loose bodies.[25] Similar lesions in the shoulder and elbow are often found in professional baseball pitchers.[2] The prolonged use of pneumatic drills will sometimes produce sequelæ: olecranon spurs, osteoarthritis and osteochondritis of elbows and osteophytes in the wrists, whilst the shoulder is rarely affected.[10]

Weight by itself normally affects the compressible parts of an articulation such as the knee, to the point that when the body is balanced on one leg, the pressure on the cartilage might reach 2 kg. per square centimetre or two atmospheres of pressure, in other words, nearly twelve times the blood pressure.[11] It is thus easily understandable that such structures will suffer a lot of wear and tear during a lifetime, with normally visible signs of primary degenerative joint disease after forty years of age. However, this degeneration can be premature or exaggerated in certain occupations, for instance in soldiers, policemen, etc. The difficult and even insurmountable obstacle to evaluation quoted previously from Ferguson[12] is applicable here especially.

On the other hand, it will not be difficult to our mind, to convince medico-legal authorities of the traumatic origin of an infectious arthritis secondary to a penetrating wound of an articulation or to an open fracture of a joint.

If trauma can be held responsible for certain clear-cut degenerative joint diseases and some infectious arthritides, the problem of estimating its influence on other primary articular diseases becomes increasingly arduous. For instance, what can be said of the interrelationship of trauma with rheumatoid arthritis, rheumatic fever, gouty arthritis and neuroarthropathies? Many authors[3, 27] are of the opinion that all these morbid entities are notably influenced by trauma. I am also of the same opinion, although I would like to make certain restrictions later on.

Rheumatoid arthritis is a frequent type of articular disease. According to Hench,[17] it would form about 35% of all rheumatic diseases at the Mayo Clinic. This morbid entity in itself can be a terrific headache for the industrial physician, because of the following two etiological factors. If trauma cannot be considered a direct cause, it can however act as a precipitating agent[27] and also by lowering local resistance, major or minor injury to joints can strongly influence the localization of the arthritic involvement.[18, 22] The importance of these facts from a medico-legal point of view is far from accepted: this problem will require much further research before the question is finally settled to the satisfaction of all concerned: physician, legislator, plant owner and worker.

The second etiological factor not sufficiently stressed as a causal agent in this disease is, we must not forget, the strain associated with certain unavoidable conditions of working life, such as the emotional disturbances brought about by anxiety over finances, by the fear of losing one's job, by the paranoid resentment concerning superiors or the frustration of seeing working companions advance and progress more rapidly. Of course, these emotional troubles cannot always be settled and corrected by the industrial physician, but sometimes, I believe, some of these disturbances could be alleviated in cooperation with firm authorities and the family physician.[5, 7, 8, 14, 17, 24, 28]

These problems in rheumatoid arthritis cannot in general be considered of interest from a compensation point of view, although the question of trauma will be the subject of frequent litigation.

Most authors[6, 16] will accept trauma as a possible precipitating factor in the origin of an acute attack of gout. Others[20] however would hold the opposite view, basing their claim on the consideration that an acute attack of gout has its inception over a period of days before the acute symptoms become evident. This might be the case in some instances, but we rather agree

with Steinbrocker,[29] Hench[15] and Comroe,[9] that exertion, trauma even of a very mild type might provoke an attack of acute gout.

The nefarious action of trauma will be seen to hold an important place even in the pathogenesis of neuroarthropathies. This "exaggerated form of osteoarthritis"[19] is due, according to the concept of Eloesser, to a lesion of the posterior nerve roots: trauma to an articulation however is essential for the production of a Charcot's joint. Thus, posterior nerve root damage and trauma are two necessary conditions, both on equal footing. In industry, however, it will always be difficult if not impossible to ascertain whether for instance the wrenching of a knee at work in 1948, is responsible for the neuroarthropathy now involving this joint, or whether another trauma, at play for instance, might not have been the real cause. Trauma of the spinal cord, fractures of the skull with cerebral hæmorrhage or section of a peripheral nerve can be implicated directly in the etiology of Charcot's joints.[21]

As can be seen from this necessarily short description, arthritis of one type or another can be considered a frequent complication of industrial trauma. Unfortunately, this problem is far from being clear-cut and its discouraging difficulty arises mostly from the fact that, in the individual case, it is very hard if not impossible to prove the direct relation between cause and effect.

If the above described facet of this problem is quite a headache for everybody, the second aspect of this same question is not much easier. If arthritis can be caused by industrial accidents or microtrauma, we firmly believe that industry can be of incredible help to arthritics, both from a physical and a psychological point of view.

The invalidism from rheumatism and arthritis is a major problem of national interest that has been disgracefully overlooked until recent years. If the death statistics of Canada are influenced very little by arthritis, the crippling has become a very serious question not only from a social but from an economical aspect. The industry and the public in general have forgotten that the invalidism of 30,000 people is worse than all the strikes that can afflict the country in one year. The millions of dollars lost in wages alone diminish by so many millions the purchasing capacity of Canada, reflecting in this way on the welfare of both labour and management, without mentioning the increased burden of taxes necessary to take care of these invalids.

Thus, the problem of the industrial rehabilitation of the physically handicapped is daily assuming greater importance, in view of the necessity of maintaining the highest possible living standards in the population. Moreover, no Christian civilization can boast of such a title, that does not help each suffering individual in its community.

In spite of these principles, industry is still wary and overcautious in the rehabilitation of its rheumatic patients and much more so in the acceptance of arthritics that are more or less crippled. Thus the industrial physician, in his endeavour to shorten the disability periods of the injured is confronted with a confusing and very unsatisfactory problem when dealing with injuries in persons affected with any type of arthritic conditions. The impossibility to foresee and predict the course such a case might take has probably caused more headaches than most of the other problems the plant physician is confronted with daily. This defeatist attitude is certainly not helped by the astonishing scarcity of references to the question of what will happen to the latent or very slightly active arthritic when exposed to injury of any kind. Several authors[1, 4, 13, 31, 32] seem to write in this same state of mind, some even going much further and suggesting that an applicant suffering from any type of joint disease should be barred from work because of the observation that an arthritic is disabled for longer or shorter periods by injuries that would not affect normal persons and the resulting disability is quite disproportionate to the causing injury: 24% of the arthritics being rendered worse by trauma. If the amount of invalidism from arthritis and rheumatism is to be reduced, there must be an expansion of treatment facilities available and an intensification of research in this broad field.

In spite of all these adverse opinions, I do not believe that arthritics, if intelligently placed, are such poor risks to industry, on the one condition that we stress the importance of the individualized approach. The fundamental approach in the placement is the same as with any type of applicants: careful consideration of the positive qualifications rather than negative focussing upon his disabilities. We fully agree with Ferguson[12] and Rigeron[26] that the arthritics like all handicapped workers are not careless.

To many a so-called normal worker, the job of the moment is just a means to an end—and perhaps a temporary means. His heart is in his work only in so far as it serves his immediate purpose. To the arthritic, however, a job on an equal basis with his more fully endowed fellow workers, is apt to represent an end in itself. It spells self-respect, financial independence, an opportunity to contribute directly to the welfare of his country and freedom from the shackles of his handicap. He gives to the work itself and to the company which entrusted it to him that fidelity which makes for quality of performance and for all-round dependability.

The placing proper should be handled with care and the evaluation of the handicap seriously taken into account. The appraisal should take into consideration the limitation of movement interfering either with work itself or with the possibility of getting to or from work. Sometimes the disability is more or less confined to the exercises of one particular movement which forms an integral part of the normal working process and these cases offer a great deal of scope for ingenuity in placing the disabled person in work compatible with his disability, yet sufficiently akin to his previous employment to enable him to utilize as much as possible of his trade skill.

In this selection, the physician and industry must be guided by the preliminary screening of experienced organizations like this one, must exercise great care in the examination and proper job placement and finally train the handicapped scientifically with proper work simplification methods individually applied as suggested by Thompson[30] both for retraining and employment.

For the minority, so severely handicapped as to be quite incapable of work under ordinary industrial conditions, some form of sheltered employment, used with encouraging results in the British Isles, may be necessary. Experience has shown that given careful selection of product, it is possible to employ on an economic basis even severely disabled people under sheltered workshop conditions: provided a reasonably balanced team is organized, with perhaps 20% of the workers having sufficient freedom of action to keep the manufacturing process moving.

Acute rheumatic fever is seldom a major contributor to incapacity and does not fluctuate as much with the occupation, but this young patient must be trained from the beginning for work consistent with his capacity. Too many gross rheumatic hearts are allowed to drift into work involving heavy physical demands leading to early breakdown.

Too many jobs eminently suited to the physical and mental capacities of these youngsters are more or less closed because of too drastic pre-employment requirements, excluding potential workers with rheumatic hearts from jobs most likely to afford them success and happiness in life.

CONCLUSION

We believe that the problem of arthritis in industry is two-fold. We do not think it should be considered as discouraging as people in general and many physicians in particular would have it. Of course several question marks remain and will require extensive and intensive research on the part of the physicians particularly interested in this very difficult part of medicine. The approach should be fundamental, trying to appreciate more fully the foundations of pathogenesis and etiology of these various diseases. On the other hand, as much publicity as possible should surround the numerous facts actually known about the rehabilitation of arthritics, the very low incidence of accidents encountered in workshops employing handicapped personnel and the very encouraging economical results obtained from such employment.

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THE ABNORMAL ELECTRO-ENCEPHALOGRAM AS RELATED TO READING DISABILITY IN CHILDREN WITH DISORDERS OF BEHAVIOUR*

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IN THE DEVELOPMENT of electroencephalography, one of the problems, as yet unsolved, has been the meaning of the abnormal electroencephalograms which occur in all types of mental illness, but which are present in especially great number in the behaviour disorders of children.[6, 7] Although the "normal" population shows only 5 to 10% abnormal EEG's, the incidence among children with psychological disorders is as high as 60 to 80%.[7] These abnormal records have been interpreted on the basis of epilepsy, of head injury and of other types of organic encephalopathy, but there is still no convincing explanation of their meaning.

The present investigation was devised because it seemed possible that there might be some relationship between these abnormal EEG's and the reading disabilities which also occur in great numbers among children with disorders of behaviour.

The character of the EEG abnormality suggests this. It is one of pattern-irregularity, dysrhythmia and oversensitivity to such factors as hyperventilation, drowsiness or sleep. Many of the records show an amplitude asymmetry with a difference in the size of the wave-forms of homologous regions of the two hemispheres. This is considered one of the signs of EEG abnormality in children[3] since it seldom appears in the records of adults or in those of "normal" children. It has also been observed that, in the majority of cases, the amplitude of the right hemisphere is greater than that of the left and, since it is known that the resting and relaxed individual produces wave-forms of higher amplitude than does the tense and active one, it has been suggested that the non-dominant or "resting" hemisphere might produce higher amplitude than the dominant. In this way the amplitude asymmetry between the hemispheres of children with disorders of behaviour has been explained as being the result of unequal and abnormal development and it has been inferred that the behavioural difficulties may also be related to such developmental irregularities within the cerebral cortex.

The fact that a very high percentage of such children have marked reading disabilities has added to this conjecture. A relationship between reading disability and mixed cortical dominance has been commonly recognized, although it has never been shown to be the sole etiological factor in such difficulties. Monroe[9] found that mixed dominance and, in particular, left eyedness is assocated with reading defects. Castner[1, 2] observed faults in drawing and in other tests of space perception in preschool children who later developed defects in reading ability.

The character of the EEG in relation to cortical dominance has been examined in other studies. Lindsley[8] has investigated hemispheral potential differences in relation to laterality and stuttering, and has found greater dys-synchrony between the wave forms of the two hemispheres of children with mixed dominance, but he makes no mention of amplitude asymmetry. Following the same line of reasoning, Hughes, Leander and Ketchum[5] have found 75% EEG abnormality in the records of 125 children with reading disability but without disorders of behaviour.

The present study was carried out upon the children who were patients in a large psychiatric ward in which, from year to year, about two-thirds of the boys and one-third of the girls had been known to have difficultes in reading associated with disorders of behaviour which had produced their hospital admissions.

METHOD

Fifty children, consecutive admissions to the children's psychiatric ward, were examined who were between the ages of 8 and 13 inclusive. Only those few were excluded who were uncooperative or who were shown by psychological tests to be incapable of learning to read because of low intelligence. Three of the subjects were subsequently discarded because of incomplete data; the remaining 47 are those of the present study.

Cortical dominance was tested for hand, foot and eye. Hand dominance was recorded from two tests, the hand with which the child wrote,

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drew or caught a ball and that with which he threaded a needle. Foot dominance was tested by noting the foot with which the child started to run and that with which he kicked a ball. Eye dominance was measured by having the child look through a tube and through a small hole, first with one eye and then the other, and noting with which the test object was said to move from the binocular point of vision. Any individual in which a different side was used in any test—hand, foot or eye—was placed in the group of mixed dominance (Table I).

EEG data were recorded on a six-channel Grass Oscillograph in the routine way utilized in the hospital. Eight leads were symmetrically placed on frontal, motor, temporal and occipital regions of the two sides of the head. Recordings were both bipolar and monopolar, and the estimate of the nature of the EEG (normal or abnormal) was based on the entire record, including the reaction to hyperventilation. In estimating amplitude asymmetry only the two monopolar readings from the occipital poles were used. This was noted in the preliminary examination purely by visual inspection. Later, all asymmetrical records were examined and evaluated. At this second examination records were considered as having marked asymmetry when the average amplitude of the occipital alpha activity of the higher side was greater than one-third the total amplitude of the average activity of the lower side.

TABLE I.

READING DISABILITY AND CORTICAL DOMINANCE

Hand	*Foot*	*Eye*	*Reading normal*	*Reading disability*
R	R	R	8	15
L	L	L	0	1
Total, pure dominance			8 (33%)	16 (67%)
R	R	L	4	9
R	R	BiL	1	4
L	L	R	0	3
L	L	BiL	0	1
R	L	R	0	0
L	R	L	0	0
R-L	R-L	R	0	1
Total, mixed dominance			5 (22%)	18 (78%)

DATA

Of the entire group of 47 cases, 34 or 72% had reading disabilities of some degree (Table I). Of the 36 males there were 27 (74%) and of the 11 females 7 (63%) with such disability. When the relation of handedness to reading disability is contemplated, 24 patients (51%) are seen to have complete laterality of dominance. This compares well with the figures given by Monroe for a much larger series[9] in which a group of 215 children with both disorders of behaviour and reading disability had 55% unilateral dominance, and the control group of 101 normal readers had 61% unilateral dominance.

In our series, of the 34 cases with reading disability 15 (47%) showed unilateral dominance and 18 (53%) mixed dominance. Or, 16 out of 24 children (67%) with unilateral dominance and 18 out of 23 (77%) with mixed dominance had difficulties in reading. This slight positive correlation between dominance and reading ability thus confirms that of Monroe. Monroe associates left-eyedness with reading disability because of difficulty in handling space in the left-to-right direction in such cases. In the present group, only four were left-eyed; all were reading disabilities. Seven were bilateral in eye function of whom five had reading disability.

TABLE II.

EEG AND CORTICAL DOMINANCE

	EEG n.		*EEG abn.*				
	No.	*Assym.*	*No.*	*Assym.*	*No.*	*Total % abn.*	*EEG % assym.*
Reading normal dominance:							
pure	0	0	8	2	8		
mixed	3	1	2	1	5		
Total	3	1	10	3	13	77	31
Reading disability dominance:							
pure	4	0	12	7	16		
mixed	6	3	12	0	18		
Total	10	3	24	7	34	71	29

In Table II the data related to EEG findings are tabulated. Here, the three qualities which might have significant relationship have been arranged—EEG abnormality and asymmetry; reading disability; and cortical dominance. It will be seen that there is no relevant difference between the amount of abnormality or asymmetry in the EEG and either cortical dominance or ability to read. But the high incidence of abnormal EEG's appears in this group as it has in similar groups of children with psychological disturbances reported elsewhere.

DISCUSSION

In this brief series, several facts emerge which are consistent with those previously reported by

others. Thus, a slight but significant correlation appears between mixed cortical dominance and difficulty in reading as it has in earlier studies.[9] Thus, also, the presence of 72% EEG abnormality in the behaviour disorders is to be expected from the reports of others[6, 7] and the 71% EEG abnormality in the reading disabilities is consistent with the findings of Hughes, Leander and Ketchum.[5] But since there is no difference in the amount of EEG abnormality between the readers and non-readers or between those with pure or mixed dominance there is no evidence here which would implicate the EEG pattern with either of these processes. This fact is of particular interest in relation to one theory as to why the EEG's of children with disorders of behaviour are abnormal. This theory which has been suggested by several, is best described by Hill.[4] This author believes that the dysrhythmia and over-reactivity of such records are the result of delayed and irregular cortical development. Since the records of younger children are always more irregular than those of older children, failure to develop, or delay, in development might account for the "immature" EEG patterns and also for the "childish" behaviour. The present negative results do not invalidate this theory, since irregularities of pattern due to irregular maturation might affect, in some instances, only the reading ability, in others only behaviour and in still others, both types of learned activity. It remains an interesting and unexplained fact that abnormal EEG's appear in high concentration in children with disabilities of reading and also among those with disorders of behaviour.

In the light of present-day clinical knowledge these findings are not unexpected. For, it is indicated clinically, that poor reading in children represents, in most cases, a symptom rather than a specific entity. There is no over-all neurological or psychodynamic pattern into which these cases fit. Emotional blocking, negativism or neglect are thought to underlie some of the disturbances. Neurotic factors, stemming from distortions in relationships, may produce anxiety, tension or blocking that interferes with the learning process. Inability to read may represent negativism, with the child poorly motivated for learning or may have suffered neglect in his schooling experience. We can best refer to these blocked, negativistic or neglected children as presenting *reading* retardations: usually the child has some reading competency but functions below his expected level.

A second group, more challenging and as yet less well understood, may be viewed as presenting true reading disabilities. Here there appears to be a basic difficulty in integrating symbols. On neurological examination we find no focal defect and in fact no abnormality in the routine examination. But more detailed testing reveals a particular defect in the area of symbol formation, visual associations or visual memory. A developmental factor would seem to be of importance in these cases. A definitive description of this integration problem remains to be provided.

In terms of practical application there are implications for therapy in such findings. The retardation group requires motivation, release from anxiety and sometimes reintegration of relationships to bring the child into a positive learning situation. The disability cases require specific training that may involve non-visual approaches such as auditory or kinesthetic or intensive work in phonics, with the aim of implementing the learning and recall of symbols and word associations.

The fact that we have found no significant relationship between specific electrocortical patterning and poor reading capacity in children is not surprsing. We are becoming increasingly aware of the high percentage of dysrhythmias, sufficiently pronounced to constitute abnormal electroencephalograms in the total number of disturbed children referred for psychiatric study. But as yet we have found little evidence of specific patterns in different diagnostic entities, beyond the definitive or focal changes in the encephalopathies or brain injuries. Again, in the present study we have found the usual high percentage of abnormal records of disturbed children without specific pattern of abnormality. Child psychiatrists are expressing growing interest in the significance of these encephalographic findings and this would appear to be an area calling for further clarification through continued research.

CONCLUSIONS

1. The data concerning the EEG's of 47 children with disorders of behaviour are presented and examined in relation to both handedness and disorders of reading.

2. A positive correlation, such as has been previously reported by others, was found be-

tween mixed dominance and reading disability.

3. No positive correlation was observed between EEG type and type of dominance.

4. No positive correlation occurred between reading disability and type of EEG.

5. From these data, therefore, it would appear that there is no significant relationship between the disorders producing electrocortical dysrhythmia and those underlying reading difficulties in children with disorders of behaviour, although both may be indices of developmental pattern irregularities.

6. There is clinical evidence that reading difficulties in children may be divided into two categories: (1) *reading retardation* in which the factors of anxiety and negativism are important; (2) *reading disability* which results from retarded or uneven development. Further tests may indicate that the abnormal EEG is related to this second group.

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NEWER TRENDS IN VENEREAL DISEASE CONTROL

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THE DECREASE in incidence of syphilis has been apparent in North America since World War II, and in British Columbia the decrease in early syphilis has been quite striking, as illustrated in Fig. 1.

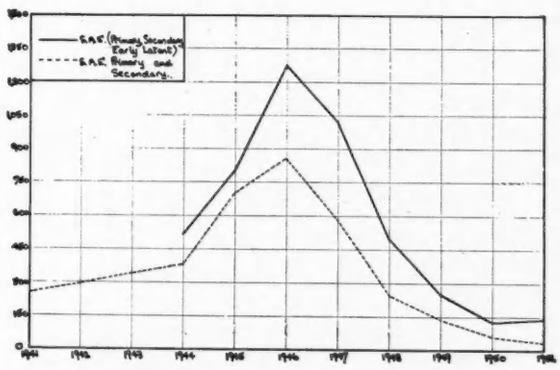

Fig. 1.—New notifications of primary, secondary, and early latent syphilis reported by all agencies, Province of British Columbia, 1941-1951.

The control of venereal disease depends on a great variety of factors, ranging from (1) the control and elimination of foci of infection, case finding, case holding and treatment of known cases, and the discovery of contacts and the treatment of them when indicated; (2) the attempted elimination of those factors which predispose to promiscuity in sexual relationship by promoting sex education in the home and school as well as by lay and nursing education in relation to venereal disease control and the constant vigil in regard to the manifold aspects of facilitation. The success which has been achieved in this aspect of facilitation in British Columbia has largely been due to the co-operation of the Medical Health Officers of the metropolitan centres and the representatives of various groups including the Liquor Control Board, the Hotel Association, City Police Department, Army, Navy and Air Force Stations in British Columbia and Washington State, and the Dominion Department of Indian Affairs, as well as by the members of the various sections of the Division of Venereal Disease Control.

The advent of penicillin has resulted in a dual trend in the overall picture of syphilis. On one hand there is an apparent marked decrease in the incidence of early syphilis. This in turn has given us a sense of victory and lack of interest both in regard to teaching and case finding.

It is important that we maintain a constant index of suspicion for syphilis in addition to the established principles of attack. We should continue education, supply of free penicillin to private physicians for the treatment of venereal disease, as well as various epidemiological procedures in regard to case finding, case holding and contact tracing.

Since 1950 we have been made aware of homosexuality as a source for the spread of venereal disease, and are more on the alert for these cases.

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We would like to bring it to general notice as an increasingly prevailing practice and as a source for the dissemination of venereal diseases (in our experience, both gonorrhœa and syphilis).[1]

It has become apparent that penicillin, because of the ease of its administration, short duration of treatment and relative innocuousness, has played a major rôle in reducing the incidence of early syphilis. Following the work of Alexander and Schoch[2] in the abortive treatment of incubating syphilis, and in an endeavour to decrease the reservoir of early syphilis in British Columbia, we in February, 1950,[3] decided to overtreat gonorrhœa with 1.5 million units of procaine penicillin G in oil with aluminum monostearate, thereby treating any concomitantly incubating syphilis, occurring, it has been estimated, in 3% of all persons reporting with gonorrhœa.

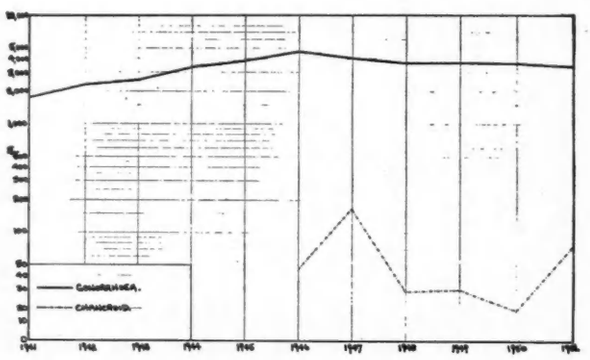

Fig. 2. — New notifications of venereal infections, gonorrhœa and chancroid, reported by all agencies, Province of British Columbia, 1941-1951.

It is to be noticed in Fig. 2 that the incidence of gonorrhœa has shown very little decrease. This may possibly be accounted for by the short incubation period and the high rate of reinfection. Hunt[4] has shown the effectiveness of penicillin in the treatment of gonorrhœa in women, and his findings lend support to the premise of the value of overtreating gonorrhœa in an endeavour to abort or cure incubating concomitant syphilis. With the return of service personnel in transit from the Far East and with mariners from ships visiting our ports from the Orient, we have in recent months been made aware of the great increase in the number of patients reporting with chancroid (see Fig. 2). Many of these men were able to remain for only a very brief period, and we found that they frequently left before complete investigations and treatment could be carried out. The treatment of chancroid is with sulfa or streptomycin but not penicillin, and yet we felt that many of these individuals had probably been exposed to concomitant syphilis and gonorrhœa. Thus pursuing our policy of trying to reduce the reservoir of early syphilis, and based on our favorable experience with the overtreatment of gonorrhœa, we adopted the following program for the management of chancroid, as of December, 1951.

1. Where time allows adequate investigation, and it is reasonably certain that no antibiotics have previously been given, the patient should be given 1.2 to 1.5 million units of penicillin, in addition to his treatment for chancroid.

2. Where darkfield is negative but time does not permit full investigation, 2.4 million units of penicillin should be given in addition to his treatment for chancroid and the patient be supplied with a travelling treatment card, showing the treatment given and the recommended follow-up examinations.

3. Where some treatment has previously been given for either a urethral discharge or a sore, investigation should be carried out as fully as possible in the time available, followed by an injection of 2.4 million units of penicillin and the issuing of a treatment book as outlined above.

In summary, it is recommended that in addition to the accepted and established principles of venereal disease control, the following methods be adopted in an endeavour to further reduce the reservoir of early syphilis and for the discovery of new cases of venereal disease.

1. Maintenance of a constant index of suspicion —keeping in mind the increasing practice of homosexuality, which is a potential source for the spread of venereal disease.

2. The overtreatment of gonorrhœa in order to abort or cure incubating concomitant syphilis.

3. The addition of penicillin to the treatment of chancroid in amounts sufficient to abort or cure incubating concomitant syphilis.

Appreciation is expressed to Miss K. Hoskins of the X-ray Department of the Vancouver General Hospital, for the illustrations.

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GENERAL PRACTICE FOR THE YOUNGER PHYSICIAN

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*[The University of Tennessee, Memphis, Tenn., has the first fully functioning general practice staff amongst medical schools in the U.S. Dr. Williamson, Chief of the General Practice Staff, writes to encourage more men to enter the field of general practice; and he knowns whereof he speaks.—*EDITOR.]

IN THE PAST FIVE YEARS the general practice of medicine and surgery has begun to regain some of the status lost during the past three decades. The shortage of physicians in American medicine has been proved to be a shortage of well trained general practitioners and ample proof has been given that the worst served area is that area where there is no general practitioner.

As a result, most young men are beginning to consider the general practice of medicine as a possible field. Undeniably, in the past the general practitioner has in most instances been the man who has been unable to specialize. With increasing emphasis now put on family physicians, young men are beginning to look with some interest on rural medicine.

Until quite recently all medical students have been indoctrinated with the statement that the general practitioner is frequently incapable of doing anything but the simplest procedures without the aid and consultation of a specialized physician. That this is not entirely true has now been demonstrated so many times and so efficiently that renewed interest is being taken in general medicine. It would seem that a review of some of the benefits of small town practice is well in order.

One of the points which would interest the young physician is that the urban physician is so busy and so crowded that very little personalized doctor-patient relationship is possible. One has but to listen to the clamour of the public for the return of the old family doctor relationship to be convinced that medical practice done under circumstances allowing this relationship is more satisfactory from the standpoint of the public.

The recent increase in hospital construction has made it extremely likely that the average well trained small town physician will have, either in his town or quite nearby, adequately equipped and staffed hospitals which will offer him facilities for caring for his patients that have never before been his to command. With this in mind, and with the certainty of help and instruction from older and more experienced physicians of the community the average young man can hope to become a reasonably competent surgeon, obstetrician, and diagnostician over a period of years. This, of course, only if he is willing to study and to apply himself to learning the necessary techniques.

In the past three decades there has been some tendency to consider the rural physician as a benign old man who, beyond his innate ability, has nothing whatever to offer the people under his care. In many cases he was considered foolish and somewhat bungling in his efforts at medical science. I would not be the one to say whether or not the accusations were true in the past, but they are certainly seldom true today. The average well trained young general physician has ample facilities at his command to become an expert medical scientist as well as an expert doctor.

The majority of problems which the American public would like to bring to the attention of the physician are more problems of the humanities than they are problems of organic disease. It is an unfortunate attribute of medical education that the average young man does not realize this; that he views the practice of medicine as an endless series of organic complexities such as he has seen in medical school. Little can be done to dispel this until students gain more practical experience with the day by day practice of medicine with perhaps a bit less ultrascientific training.

We often tell our senior students at the University of Tennessee that, in rural practice, scientific medicine is one of the greatest sources of joy that the doctor has. His scientific accomplishments are indeed something to be proud of and something with which he can serve his patients. But we say further that he makes his bread and butter and pays his income tax by applying the art of medicine. By no stretch of the imagination can the art of medicine be called a mental discipline. This writer has no words with which to describe the basic pleasures that arise from applied medical artistry, but those pleasures are personal and they are available much more to the rural family physician than they are to his urban colleague.

With rural physicians becoming better and better equipped and better trained to carry out many of the procedures of medicine, there is a

distinct financial advantage for the young man in rural location. It is certainly true that the general practitioner makes less than many urban specialists, but, if one examines these statistics more closely, one perceives that the well equipped modern rural physician far outstrips his urban colleague in income. It soon becomes apparent that the real reason the general practitioner's income appears so low in statistical surveys is because of the number of older physicians who are not trained and who have not had equipment to do the more complicated procedures.

There is an advantage of friendship in rural practice that applies not only to the doctor but to his wife and children. An honest, sincere, and hardworking family doctor gains more approbation from his patients than any other practitioner. His family is likely to be one of the most honoured families in town and the friendships that they form are usually deep, honest, and lasting friendships that make his life a truly worthy one.

To the young doctor who believes he can appreciate the human side of medicine, to the young doctor who can approach his patient from the standpoint of "what can I do for this person?" rural practice offers more in the way of satisfaction and more in the way of personal return than metropolitan specialism.

This is not to be taken in any way as critical of our specialist colleagues. Medicine owes them a debt that can in all probability never be paid for the splendid advances of the past century. One must, however, admit that the specialty fields are becoming crowded and that the pressing need in American medicine is for well trained family doctors.

BASAL BODY TEMPERATURE IN OVULATION

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THERE are three methods of determining the presence or absence of ovulation in the human female: (1) changes in vaginal cytology; (2) Endometrial biopsy; (3) basal body temperature determination.

Of these the most exact method is the endometrial biopsy, where we have definite cytological evidence of change in the character of the endometrium. The change is from a proliferative picture to a secretory phase, indicating ovulation and the presence of a corpus luteum in the ovary.

Vaginally, there is a gradual change in the cells, obtained by smear, to a highly cornified epithelium with a disappearance of the numerous leucocytes, when ovulation occurs and the progesterone of the corpus luteum thus formed begins to function.

The basal body temperature does not involve the obtaining of any smears, or tissue specimens, and is a method that the patient, properly instructed, can follow without any technical knowledge. It is therefore, one that any physician can apply to study of his patient both from the physiological and pathological angles.

The basal body temperature, preferably a rectal temperature taken at a specific time each morning, between 6.00 a.m. and 8.00 a.m. before rising, in the average normal woman is about 97.7° F. (36.5° C.) during the so-called proliferative endometrial phase of the menstrual cycle. It is affected by colds, infections and alcohol. On the day of ovulation the temperature at this specified time will drop about 1/5 to 2/5 of a degree F. and rise the next day a whole degree to 98.6° F. or 99° F. and will remain at that level for the entire secretory or progestin phase of the cycle. Should pregnancy occur, the elevated temperature of the progestin phase will remain during the entire period of pregnancy. In the last two months some observers have noted a gradual fall in the basal body temperature.

Should the pregnancy lose its vitality, as in spontaneous abortion, the temperature level will again fall, so that temperature readings can be utilized in diagnosis of pregnancy and early abortion, according to Alan Palmer.[1]

The cyclical fluctuation of regularly menstruating women according to many observers, is due to the action of œstrogen and progesterone elaborated by the ovary, the basal body temperature being low during the œstrin phase of ovarian activity and high during the progesterone phase. The sudden rise occurring at mid-intramenstruum, is known as the "thermal shift". The basal body temperature will show that the duration of the progesterone phase of ovarian activity

is relatively constant, about fourteen days and independent of the length of the menstrual cycle. The pre-ovulating phase may vary greatly, however, depending on the regularity or irregularity of the menstrual cycle, so that a woman with a 21-day cycle will have a pre-ovulating phase of seven days and a post-ovulatory phase of fourteen days. Inversely, a woman with a forty day cycle will have an œstrin phase of twenty-six days and a progesterone phase of fourteen days.

Without the basal body temperature the designation of a certain day as the time of ovulation, is inaccurate. In a composite chart of 22 women, who subsequently conceived, the œstrin phase varied from nine to twenty-nine days and averaged 17.3 days (Fig. 1). This chart demonstrates the abrupt thermal shift occurring within

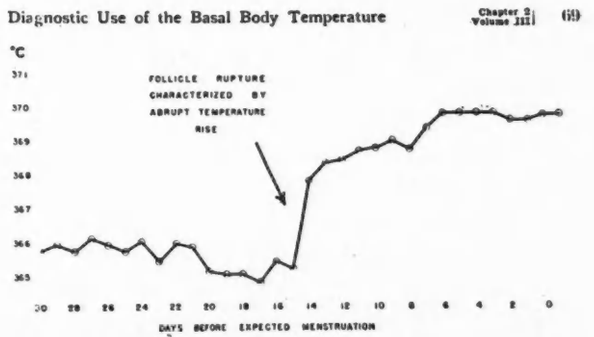

Fig. 1.—Composite curve constructed from the individual curves recorded by 22 women during ovarian cycles in which conception occurred. The curves were superimposed so that the day during which the ovulatory rise of the temperature began coincides. (The duration of the pre-ovulatory phase in these 22 cycles ranges from 9 to 29 days, average 17.3 days.) (From Davis Obstetrics and Gynæcology, Chap. 2 by Alan Palmer. By permission of W. F. Prior & Co., Hagerstown, Md.)

twenty-four hours and according to Palmer,[3] would signify ovulation with rupture of the Graafian follicle. In some instances the thermal shift, instead of occurring abruptly in twenty-four hours, does so slowly over a period of three to four days. Palmer feels that the thermal shift does not always signify actual extrusion of the ovum from the ovary. He feels that where the thermal shift is rapid, within twenty-four hours, there has been actual rupture of the Graafian follicle with extrusion of the ovum. Where it is slow, he believes that the Graafian follicle has matured but no rupture or extrusion of the egg has actually occurred. In these cases the corpus luteum replaced the Graafian follicle, which explains the resultant thermal shift. If ovulation occurs one can state that the optimum fertility is the two to five day period which spans the thermal shift of the basal body temperature.

The sharply defined basal body temperature curve, associated with a presumed ovulatory cycle, was substantiated by Abarbanel[4] of Los Angeles by several hundred endometrial biopsies.

According to Halbrecht[5] of Tel Aviv, in his series of cases, in about 15%, the morning basal body temperature was as low as 96.8° F. with a corresponding elevation in the progestin phase. These low temperatures were constant during the whole œstrin phase and were not affected by hormonal or thyroid therapy, progestin or œstrogen. He similarly found that the basal metabolic rate was unaffected in these cases. There was also a smaller percentage with elevated morning temperature and correspondingly higher progestational elevations.

Rubinstein and Lindsley in 1937 showed a definite correlation between the fluctuation of basal body temperature and vaginal smears in five menstrual cycles, observed in four young adult women. Rubinstein observed a constant relationship between the lowest body temperature of the month and the characteristic ovulation smear, and the highest basal body temperature and the characteristic progestin phase smear.

DISCUSSION

Progesterone is the hormone responsible for the thermal shift after ovulation and through the progestation phase of the cycle, according to M. E. Davis and Fugo,[7] and Baxton and Atkins.[8]

Palmer and Devillers[9] showed that in ovariectomized women, injection of 5 mgm. of œstradial benzoate produced a decrease in basal body temperature for several days and injection of 10 mgm. of progesterone produced an increase in basal body temperature for two days. Halbrecht was unable to duplicate these experiments. Progesterone injections on the fifteenth day of the cycle could not produce temperature elevations in his series of cases and he felt some other factor, in addition to progestin, was responsible for the thermal shift.

Palmer[10] in 1942 stated that where ovulation is suppressed by œstrogen therapy the basal body temperature will show this. In his series he felt that menstrual disorders were more satisfactorily investigated by basal body temperature than by hormone excretion determination, endometrial biopsies, or vaginal smears. Barton and Wiesner in 1948 stated that the thermal shift may be an indication of, but not positive evi-

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dence of, ovulation. Greulich[12] in 1946 performed laparotomies in fourteen patients in order to correlate findings at time of operation with changes in the basal body temperature. In eight, where basal body temperature indicated ovulation, laparotomy confirmed ovulation. In five where basal body temperature indicated no ovulation laparotomy also confirmed this. One false basal body temperature was confirmed by the fourteenth laparotomy.

Acyclic basal body temperature curves occur before puberty, after the menopause, in persistent œstrogen therapy leading to a proliferative type of endometrium, in certain pituitary conditions, and in some types of ovarian growths. Greenhill states, in his 1951 Year Book of Obstetrics and Gynæcology, that he found basal body temperature helpful in only 50% of cases. He also feels vaginal smears to be of no great help. As generally recognized, premenstrual endometrial biopsies are the only certain method. Therefore in applying artificial insemination the basal body temperature can only be an approximate indication of ovulation time.

A monophasic temperature curve indicates that ovulation has not occurred during that month, but does not necessarily indicate that every period is anovulatory. In many cases of amenorrhœa, a monophasic curve may suddenly become biphasic, indicating that ovulation has spontaneously occurred.

At this point I wish to report, in detail, a case under my care in the last six months that demonstrates all the points the basal body temperature would seem to indicate. This case is of further interest in that the patient called the turn of events correctly in every instance.

Mrs. A.B. first consulted me regarding her inability to conceive. She was twenty-three years of age, white, and engaged in clerical work. She had been married two years and no contraception had been employed for one year. Pelvic examination had revealed a normal sized uterus in good position, adnexæ and cervix were normal. Her periods were twenty-eight days in cycle, were moderate in amount for three days, with very little pain. Her husband showed a satisfactory seminal sample. She was instructed in the art of basal body temperature and was put on a small dose of thyroid gr. ¼ daily. Her basal body temperature charts appeared normal in their diphasic picture. She was late on two occasions but no diagnosis of pregnancy could be made from physical indications or basal body temperature.

After four to five months of observation the basal body temperature remained elevated for more than two weeks of the progestin phase of the cycle. The patient made a diagnosis of pregnancy on herself. The breasts were positive and there was some urinary frequency. No pelvic examination or pregnancy tests were done. Because of the two previous delayed periods the patient insisted on some prophylactic therapy as far as abortion was concerned. When her amenorrhœa was four weeks the patient was started on large doses of diethylstilbœsterol according to the Smith and Smith and Karnaky regimens of therapy. The initial dose was 15 mgm. daily increasing the amount 5 mgm. daily every two weeks. Because of this therapy no confirmatory pregnancy tests were made. Unknown to me the patient meanwhile kept careful basal body temperature charts. She continued at her daily routine except for no work at home and cessation of sexual relations.

When amenorrhœa was ten weeks old the patient called me in a state of alarm. Her basal body temperature that morning had fallen to the level of her usual phase. I tried to reassure her but the patient predicted a spontaneous abortion would occur. She came into the office that day. Abdominal examination revealed that the uterus was easily palpable and two and a half months in size. There were no signs at that time of any coloured vaginal discharge. She was asked to absent herself from work and the same routine of therapy was continued. One week later the patient began to show a brownish discharge. During that whole week the basal body temperature remained depressed. Her bleeding increased in amount followed by severe cramps which finally resulted in the expulsion of the products of conception completely. She has since had two normal periods.

SUMMARY

1. The basal body temperature is a reliable indicator of time of ovulation through its fluctuations.

2. The basal body temperature can accurately indicate early pregnancy as well as inevitable spontaneous abortion.

3. Œstrogen and progesterone are the ovary-elaborated hormones that determine the diphasic character of the basal body temperature.

4. A case is reported to demonstrate the above mentioned observations.

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THE HEPATIC BLOOD FLOW IN RESTING HYPERTENSIVE PATIENTS BEFORE AND AFTER SPLANCHNICECTOMY

The authors studied 41 hypertensive patients and 21 normotensive patients for hepatic blood flow. Estimated hepatic blood flow (E.H.B.F.) was not altered in the two groups, while arterial pressure of calculated hepatic-portal resistance (H.P.R.) was higher in the hypertensive group than in the normotensive group. Estimations 2 weeks after splanchnicectomy in 13 of the hypertensive patients showed that the E.H.B.F. was definitely higher and H.P.R. was significantly lower than before operation. In 6 of the patients who had splanchnicectomy the E.H.B.F. and H.P.R. returned to preoperative levels 4 months following operation.—Wilkins, R. W., Culbertson, J. W. and Rymut, A. A.: *J. Clin. Investigation*, 31: 529, 1952.

RECURRING DISSECTING ANEURYSM OF THE AORTA*

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JAMES H. DARRAGH, M.D.‡ and
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DISSECTING ANEURYSM of the aorta is most often an acute and fatal illness.[1] In instances where death is not immediate, however, recurrences may be seen. We have recently studied a case of recurring dissecting aneurysm of the aorta with two separate dissections of the wall, and the unusual necropsy findings as well as interesting clinical features have prompted us to report it.

CASE REPORT

A 58-year old white female was brought to the Boston City Hospital in a state of coma. Two hours previously her husband, had found her lying unconscious on the floor. The anamnesis revealed that the patient had had an extensive medical investigation at another hospital in Boston some nine months previously; a diagnosis of decompensated hypertensive cardiovascular disease was made at this time. She was treated with digitalis, mercurials, and salt restriction. Five months prior to the present admission, she had a sudden onset of sharp colicky pain in the lower abdomen. This was soon accompanied by a steady sharp mid-lumbar back pain which increased in severity. The patient was hospitalized and was noted to be acutely ill. Examination of the abdomen revealed only slight spasm and normal peristalsis. Roentgenograms of the back and abdomen were not remarkable. W.B.C. was 13,700. Over a period of 10 days the pain and discomfort subsided gradually and the patient was able to return to her activities around the house.

Examination on the present admission revealed a deeply comatose and elderly female who responded slightly to strong painful stimuli. There was a bleeding scalp laceration presumably caused by her recent fall. The neck was supple and the pupils were equal in size and reactive to light. The fundi were not well visualized due to cataract formations and frequent movement of the eyeballs. The left nasolabial fold was flattened and the left side of the mouth drooped visibly. The limbs on the left side of the body were flaccid and hyporeflexic and there was a bilateral extensor plantar response. The pulse rate was 100 and the B.P. 170/100. The clinical record did not state in which arm these observations were made. Respirations were rapid but the lungs were clear. The left border of cardiac dullness was 1.5 cm. beyond the mid-clavicular line. The rhythm was regular and a grade iii systolic mitral murmur could be heard best at the apex. The abdomen and extremities were not remarkable. Laboratory tests revealed Hgb. 11.8 grams, Hct. 40, CSR 22 mm./hour, WBC 24,500 and B.U.N. 23. Lumbar puncture showed a pressure of 240 mm. of water, with 4,000 RBC and 30 WBC per cubic millimetre and total protein of 29 mgm. %. Hinton was negative.

The patient remained deeply comatose, her respirations became more laboured and she expired less than 12 hours following her admission.

Autopsy findings.—Autopsy was performed 10 hours after death. The parietal pericardium was distended by 700 c.c. of fluid and clotted blood. The intrapericardial portion of the aorta was wider than normal and the right lateral portion was reddish-black in colour and œdematous. On compressing the ascending aorta, blood flowed from the aorta into the pericardial cavity through a 0.8 cm. tear in the adventitia, 1.5 cm. above the aortic valve. After removing the remainder of the organs, the aorta and the heart were removed together, and the aorta was opened along its posterior border (Fig. 1). The diameter of the aorta was increased from its origin to the level of the inferior mesenteric artery, and this was most marked in the ascending portion. There were atheromatous plaques throughout the intimal surface most prominent in the abdominal aorta, with some calcification but no ulceration. From the level of the inferior mesenteric artery to a distance 2 cm. below the left subclavian artery, there was a double-barrelled aorta.

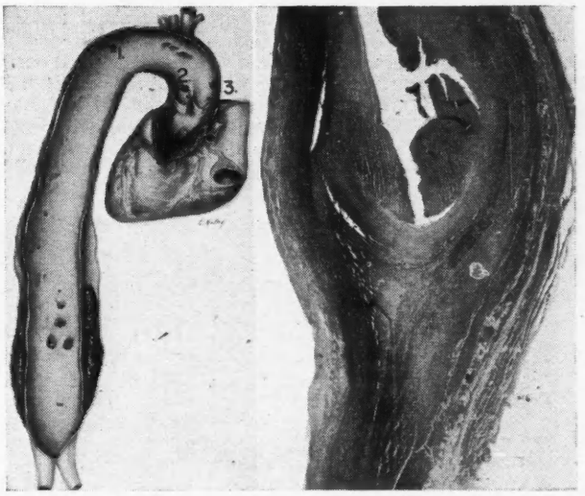

Fig. 1 Fig. 2

Fig. 1.—Drawing of heart and aorta. The aorta has been opened along the posterior aspect. The arrows indicate: (1) The point of rupture from the lumen into the healed dissection in the thoracic and abdominal aorta. (2) The tear in the intima communicating with the recent dissection in the ascending aorta. (3) The tear in the adventitia communicating with the pericardial sac.
Fig. 2.—Section through edge of healed dissection with adventitia on the right and intima on the left. It shows old tear in media with fibrous thickening of intima of abnormal channel. (Verhoeff's elastic tissue stain X15).

The abnormal channel in the wall of the aorta involved up to 2/3 of the circumference, and lay posteriorly and laterally, the anterior portion being spared. The lining of the abnormal channel was smooth except for occasional excrescences up to 0.3 cm. in diameter. Several lumbar arteries passed through this abnormal channel. The cœliac, mesenteric, and renal arteries were not involved. At the upper end of this channel, there was a smooth edged, 0.5 cm. foramen connecting the abnormal channel with the lumen of the aorta. No other communication was observed. At the lower end of the abnormal channel, the lumen was obliterated by a mass of old and recent thrombus.

One cm. above the left anterior cusp of the aortic valve, there was a 1 cm. tear in the intima of the aorta, which communicated with another abnormal channel in the wall of the ascending aorta. This involved nearly 90% of the circumference of the ascending aorta, but less than 50% of the arch of the aorta, and extended as far as the left subclavian artery. There was a band of intact aorta 2 cm. in width in this region, separating the old and the recent dissections in the aortic wall.

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The walls of the dissection in the ascending and arch of the aorta were thinner and more pliable than in the thoracic and abdominal aorta, and the surfaces granular. This dissection did not involve the coronary arteries, but extended up the innominate artery and the right common carotid artery to the level of the inferior edge of the thyroid cartilage. About 50% of the circumference of the wall of the innominate and common carotid arteries was involved in the dissection. The right and left subclavian arteries, and the left common carotid artery were spared.

There was bilateral hydrothorax, (200 c.c. clear yellow fluid); chronic passive congestion of the lungs, acute congestion of the liver and spleen, moderate coronary sclerosis and cardiac enlargement (500 grams). The major veins of the thorax and abdomen were markedly distended, consistent with acute cardiac tamponade.

The brain was sectioned after formalin fixation. There was a small interhemispheric subdural hæmatoma (fresh) on the left side of the falx cerebri in its anterior portion. Serial horizontal sections through the hemispheres revealed a few small areas of hæmorrhagic infarction in the right parietal lobe. These appeared not to be in continuity with one another, as areas of normal looking cortex separated them. The vessels at the base of the brain showed arteriosclerosis, and the right internal carotid artery in particular showed a plaque which had narrowed the lumen of the artery to about one-third of its normal size. The rest of the brain appeared normal, and the gross diagnosis was focal areas of hæmorrhagic infarction of the right parietal lobe.

Microscopic examination of sections of abdominal aorta below the inferior mesenteric artery showed subintimal atherosclerosis with calcification. Sections from the healed dissecting aneurysm (Fig. 2) showed atherosclerosis of the subintimal layer, and the abnormal channel in the media was lined with fibrous connective tissue and endothelium (Fig. 3). There were several granular areas in the lining of the abnormal channel, suggesting atherosclerosis, but fat stains of these areas demonstrated no evidence of fatty deposition. Sections from the ascending aorta (Fig. 4) showed that the media had been split in the middle or between the inner 2/3 and the outer 1/3 with no deposition of fibrous connective tissue on the exposed surfaces of the media. Examination of sections from various levels of the aorta with phloxine methylene blue and elastic tissue stains showed areas of cystic mucoid degeneration in the media.

Comment.—Due to the deposition of fibrous connective tissue, the endothelialization of the dissection in the thoracic and abdominal aorta, and the organizing thrombus at its inferior portion, we believe that this process occurred some time before death, and represented a healed dissecting aneurysm. Although no definite point of re-rupture was found in this case we feel that there must have been one, perhaps obscured on

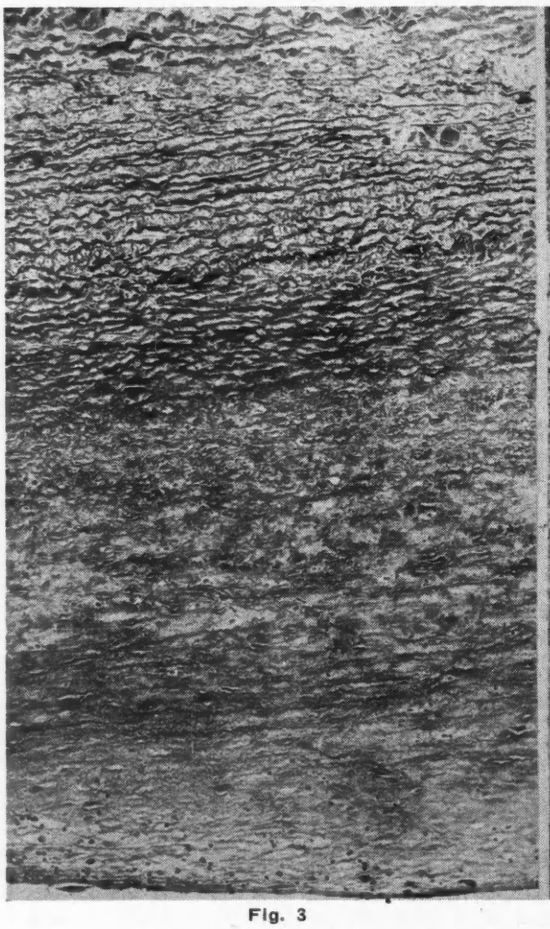

Fig. 3

Fig. 4

Fig. 3.—Section through outer wall of new channel in healed dissection. It shows endothelial lining of the new channel and fibrous thickening between the endothelium and external one-third of media. (Verhoeff's elastic tissue stain X150). **Fig. 4.**—Section through edge of recent dissection in ascending aorta showing tear in media containing fresh blood clot. The intima is on the left. (Verhoeff's elastic tissue stain X30).

opening the aorta, since nearly every case which survives the initial dissection re-ruptures into the lumen. The patient survived the initial episode probably because no major arterial trunk was occluded. The final dissection in the ascending aorta occurred about 12 hours prior to death, and we do not know the events which preceded it. Since there was a dissection in the innominate and right carotid arteries, their lumens must have been partially or totally occluded by the blood in the abnormal channel in the media. Possibly due to the pre-existing atherosclerosis of the right carotid artery, there was sufficient impairment of the blood supply to the brain to produce infarction of the right cerebral hemisphere, unconsciousness, left hemiparesis, and the other neurological symptoms and signs already described. It is felt that the scalp laceration and the inter-hemispheric subdural hæmatoma were produced when the patient fell after the onset of coma, and did not contribute to the patient's demise. The 400 red blood cells per c.mm. in the cerebrospinal fluid can probably be explained on this basis. The terminal rupture into the pericardial cavity with cardiac tamponade occurred shortly before death.

DISCUSSION

Following acute dissection of the aorta, 25% will progress to various degrees of healing.[2] Approximately 10% will heal without subsequent tear and die of other causes.[3] The remainder of the former group of patients will subsequently have extension of the dissecting process in the aorta, or rupture of the external layer of the abnormal channel. Although the disease of the aorta which led to the dissecting process is still present, the prognosis is variable in the cases in which healing has occurred. Hall,[4] described a patient who lived for 15 years after the initial episode of dissection, while Graham's case,[5] was followed for more than 30 years and at autopsy the aneurysm was found to extend the whole length of the abdominal and thoracic aorta. The three cases which Weiss *et al.*[3] reported, died of other causes many months after the original dissection of the aorta had taken place, and enjoyed good health in the interim. However, in a small group of the patients in whom healing has occurred, recurring dissections of the aorta will take place and constitute the final cause of death. Shennan,[6] has described a case in which four separate dissections of the aorta could be demonstrated, the first having occurred some six months prior to death. Frothingham's patient at postmortem examination[7] had several healed dissecting aneurysms of the abdominal aorta as well as a fresh dissection of the thoracic aorta.

We have reviewed 61 autopsied cases of dissecting aneurysm of the aorta at the Boston City Hospital (1933-1950), and have found 2 cases of recurring dissecting aneurysm of the aorta including our own. Although it is difficult to be positive about the time at which a previous dissection of the aorta occurred, an approximation can be made from the clinical history correlated with the necropsy findings. On this basis, we believe that in the above 2 cases of recurring dissecting aneurysm of the aorta the initial episode occurred 12 months and 5 months prior to death.

Another unusual feature of the case which we described is the pattern of cerebral damage with which this patient presented herself. Although neurological complications in dissecting aneurysm of the aorta are not infrequent, occurring in one-third of 38 autopsied cases reviewed by Weisman and Adams,[8] only 1 of their cases had encephalopathy, while the remainder demonstrated either ischæmic or myelopathy. In 61 autopsied cases of dissecting aneurysm of the aorta at the Boston City Hospital (1933-1950), 4 cases had neurological changes on the basis of interference with the blood supply of the brain by the dissecting process. These constitute cases of so called "carotid hemiplegia". A similar type of case was recently described at a clinicopathological exercise,[9] while Shennan's case No. 16 is in many respects similar to our own.[10]

The case we are reporting emphasizes the importance of non-fatal dissection of the aorta, and the clinician should consider this diagnosis in any case of unusual abdominal or back symptomatology. For instance, in the case described by Shennan,[6] the patient's original complaint six months prior to death was severe abdominal pain. A diagnosis of perforated ulcer was made and a needless laparotomy was performed. At autopsy there was no evidence of an ulcer or of any other unusual abdominal pathology aside from the dissection of the abdominal aorta which had healed. In our own case, the dissection of the aorta produced symptoms of crampy lower abdominal and severe back pain. It was only at autopsy 5 months later, when a healed dissection of the abdominal aorta was demonstrated, that

her previous clinical symptoms could be interpreted properly. Although the ante-mortem diagnosis may be made more frequently in dissections which occlude major arterial trunks, a fatal outcome is more likely in such cases, so that dissections such as our patient's original one which do not involve major arterial trunks are the ones which permit survival and are the most difficult ones to diagnose.

SUMMARY AND CONCLUSIONS

We have reported a case of recurring dissecting aneurysm of the aorta in which the original dissection occurred six months prior to death and the final dissection in the ascending aorta led to occlusion of the carotid artery with hemiplegia and terminal cardiac tamponade. Among 61 autopsied cases of dissecting aneurysm of the aorta at the Boston City Hospital during the past 17 years, there have been 2 cases of recurring dissecting aneurysm. Dissections which do not compromise the blood supply of major arterial trunks are compatible with long periods of survival and are at the same time the most difficult type of dissection to diagnose ante-mortem.

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CŒLIAC GANGLION SYNDROME*

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THE TERM "cœliac ganglion syndrome" has been chosen to describe a painful abdominal condition in which the pain pathways travel via the cœliac ganglion and which can be treated by therapy directed at or proximal to the ganglion. A similar and in some cases undoubtedly the same condition, has been described in the past as "biliary dyskinesia" or "functional bowel distress". During the past year there have been four cases in this hospital who were suffering from this syndrome and who benefited by its recognition and appropriate therapy.

It was Hurst, in 1911, who first demonstrated that the viscera were painful to adequate stimuli. He used balloons attached to the end of long rubber tubing, which the patient swallowed and which could be inflated to any desired size. He could always produce abdominal pain by adequate distension of the balloon. Previous to Hurst's work, the viscera were thought to be insensitive as ordinary stimuli such as burning and cutting caused no pain. In 1926 Ryle decided, from experimental and clinical observations, that tension of the muscle coat of the bowel, by distension or contraction, was the stimulus that produced pain. Ray and Neill[1] in 1947, operating under local field block, showed that it is the mesentery or the viscero-mesenteric junction that is most sensitive and that this area contains Pacinian corpuscles and undifferentiated poorly myelinated nerve endings. The Pacinian corpuscles degenerate after cœliac ganglionectomy.

Kinsella,[3] in his excellent monograph on abdominal pain, offers what appears to be conclusive evidence and argument in favour of the *whole* viscera being sensitive to *adequate* stimuli. The mesentery is more sensitive due to the crowding together of the afferent nerve fibres there. Pinching the bowel may not be painful as not sufficient nerve fibres are stimulated. If the organ is inflamed however the same stimulus that was formerly not felt will now be painful. The adequate stimulus probably operates by pressure on nerve fibres or endings, this pressure may be due to œdema, strong contracture of smooth muscle, or excessive sudden dilatation, especially of ducts, such as the common bile duct and ureters. It is apparent that minor derangements where the nerves are crowded together, for example in the cœliac ganglion, might produce major results in the form of pain and visceral dysfunction.

As recently as 1947 Grimson *et al.*[2] undertook clinical experimentation to prove that all ab-

*As presented in part to the Staff of the Royal Columbian Hospital, New Westminster, October 20, 1951.

dominal visceral pain pathways travelled via the sympathetic nervous system and that the vagus was not involved in the transmission of abdominal pain. He stimulated the central cut end of vagi of patients under spinal anæsthesia, by pinching and faradism, and produced only pain in the neck in some cases, whereas stimulation of the central cut end of the great splanchnic nerve, in patients where the spinal anæsthetic was wearing off, produced severe abdominal pain. There is no doubt now that abdominal visceral pain is mediated solely through afferent sympathetic nerve fibres.

The first four patients to be presented all suffered from the above syndrome. They had all been thoroughly investigated by competent specialists and all relevant laboratory and x-ray work had been done. For the sake of space much of this work is not included in the case reports. The last two cases are included in this presentation to illustrate other abdominal pain syndromes that could be confused with the condition being discussed.

CASE 1

Mrs. A, age 33. This patient had had recurrent bouts of right lower quadrant pain since 1944. Three lower abdominal laparotomies since that time had revealed endometriosis and cystic ovaries. The appendix and uterus had been removed. She had had only temporary relief of her pain following each of these operations. The pain was sudden in onset, crampy and occasionally burning in character and associated with complete inability to pass stool or flatus. The pain was worse when lying on her left side and least when lying on her right side. She noticed moderate right sided abdominal distension with the pain at times. She would walk carefully, slightly bent over as if a jar would aggravate the pain. She was usually confined to bed with an attack and would need frequent doses of demerol. Vomiting accompanied the pain but gave no relief. The pain lasted several days at a time and was becoming progressively more frequent and of longer duration. An attack was sometimes precipitated by an upper respiratory infection.

Examination on August 9, 1951, following several days of pain revealed a dark, intelligent, rather tense women who was having moderate pain. She had lost some weight. There were no abnormalities apart from the abdomen. She was moderately tender over the right lower quadrant and particularly so at two spots, one about 2″ to the right and above the umbilicus and the other about 3″ below and to the right of the umbilicus. A splanchnic block was performed on the right side on August 10 using 25 c.c. 2% procaine. She had complete relief of her pain within one minute and had a bowel movement the next day. She was discharged from hospital and had complete relief of all pain and felt better than for years, until August 18, when the pain suddenly recurred. Splanchnic block (right) was repeated on August 19 and gave immediate relief again. This relief lasted for twenty five hours. Another block on August 21 using only 5 c.c. 2% procaine gave immediate relief—the extra 20 c.c. being added after an interval. She had relief for only one and one-half hours after this block. On August 27 the right splanchnic nerves and the sympathetic chain from thoracic viii to L i inclusive were removed by a transthoracic approach through the bed of the 10th rib. At operation a small hæmatoma was noted in the cœliac ganglion. This probably accounted for the rapid recurrence of the pain following the third block. She had fairly severe postoperative pain with radiation to the abdomen. This is now subsiding (October 20) and she only has slight superficial pain in the distribution of the 10th intercostal nerve. She is gaining weight and is pleased with the result to date.

CASE 2

Mrs. B., age 35. This patient was first seen on January 26, 1951. She had had almost constantly, a dull but severe pain just below and to the right of the umbilicus since the birth of a premature infant (accidental hæmorrhage) seven months previously. She had spent most of this time in bed and needed demerol daily. The pain was practically confined to the right side of the abdomen, but did extend about 1½″ to the left across the mid-line. The pain was worse on movement and was least when she was perfectly quiet. Nausea and vomiting occasionally accompanied the pain but the vomiting gave no relief. She had difficulty voiding at times. The abdomen became distended sometimes also. This pain was somewhat similar to the pain she had had three years ago, at which time she had been operated on for "acute appendicitis". The appendix was normal, but there was a loop of small bowel incarcerated in a hole by an adherent mesenteric gland. The gland was removed and found to be caseous, although no tubercle bacilli were demonstrated in it. Convalescence from this operation was uneventful.

Examination revealed a dark, thin, intelligent woman with a moderate tachycardia (pulse 110 to 120). There were no abnormalities apart from the abdomen with the exception of a moderately elevated sedimentation rate (28 mm.—one hour). The abdomen was soft and doughy, and tender over the whole right lower quadrant, but especially so about 1″ lateral to the upper end of the old right rectus scar and also about 1½″ medial to it. The tenderness in these spots was worse when she tensed her abdominal muscles, whereas the general tenderness was worse when her muscle were relaxed. The tender spots were infiltrated with 2% procaine on January 27 with relief of the superficial tenderness but persistence of the deep tenderness. Following this procedure her pain was generally worse. On January 31 a right splanchnic block was performed with 25 c.c. 2% procaine. She had immediate and complete relief of pain and all tenderness disappeared. There was four hours' relief following this procedure and when the pain did recur it was not so severe. The block was repeated on February 3 and again gave immediate relief which lasted for forty-eight hours. Voiding also became normal after this block. The block was repeated on February 5 with a good result and on February 19 laparotomy revealed a perfectly normal abdomen with the exception of two tiny fibroids on the fundus of the uterus. The right cœliac ganglion was removed. She has had complete relief of pain since the operation (October 30) and is leading a normal life although she tires easily. Her blood pressure is unchanged at 120/80.

CASE 3

Mr. C., age 26. A thin, dark, intelligent man. This patient had a vagotomy and partial gastrectomy performed on October 27, 1950, for a repeatedly hæmorrhaging duodenal ulcer. He did extremely well for the first ten days, at which time he developed severe crampy upper abdominal pain which was mostly right sided. Right-sided splanchnic block gave him relief for several hours on two occasions. Various other treatments including heavy sedation failed to control his severe recurrent pain and vomiting, and on November 30, 1950, a laparotomy revealed partial small bowel obstruction about two feet below the anastomosis, caused by an adhesion to the abdominal wall. This was corrected, but almost immediately following this operation he had the same pain as previously except that it was more severe and he needed demerol almost constantly. After three months of

this he was in a declining state physically and mentally with recurrent bouts of pain, vomiting and distention. On March 5, 1951, a right splanchnic block was done which relieved the pain in the right side of the abdomen which became less distended and some bowel sounds became audible. A left sided splanchnic block done about 45 minutes later completely relieved all his pain and the abdomen became flat, along with vigorous peristalsis. He had bilateral splanchnic blocks done on March 7, 9, 13, 16 and 20 and on April 6, 11, 15, and 22 with periods of relief from nine hours to four days at a time. From April to August 1951 he was only slightly, if any, improved and had recurrent hæmatemesis. On August 6 a laparotomy was undertaken. The only pathological condition found was a small adhesion to the base of the mesentery of the small bowel. In view of the history the small bowel was plicated throughout its full length and a right cœliac ganglionectomy performed. This latter procedure was difficult owing to the scarring from the gastrectomy. There was a great deal of abdominal pain, probably mostly in the wound, postoperatively, but he gradually settled down. By October 15 he had gained 35 lb. in weight and felt very well. He had only slight lower abdominal pain occasionally and he thought it was superficial. The following day he started to have bilateral lower abdominal crampy pain and a few days later vomited blood.

This pain is more right sided than left and is unaffected by I.V. procaine therapy, but is relieved by right sided splanchnic blocks. It is starting to affect the right upper abdomen also. It is felt that an incomplete ganglionectomy was performed due to the fibrosis following the gastrectomy and it is probable that a transthoracic splanchnectomy will have to be done.

CASE 4

Mrs. D., age 33. This patient was also dark, thin, intelligent and rather tense. Her history dates back to 1935 when she had an appendectomy performed. Between 1935-1947 she had one birth (premature), three miscarriages and a laparotomy (1944) for uterine fixation and removal of an ovarian cyst. An exploratory laparotomy in 1947 revealed a pregnant uterus and she was closed without anything being done. Later in 1947 she had a hysterectomy performed for an inevitable abortion. Starting in April, 1948, she developed abdominal pain and distension and vomiting along with inability to void. She needed almost constant sedation, enemata and catheterization. X-rays at that time revealed bowel distension with atony but no evidence of obstruction. Cystoscopic examination revealed no cause for the inability to void. She had five laparotomies between April 1948 and August 1950 for bowel obstruction. The operation in August 1950 was a right hemicolectomy, and at which time considerable time and effort were spent trying to get the Miller-Abbott tube through the pylorus, but without success. She awoke almost immediately postoperatively with terrific pain in the right epigastrium which was not controlled by large and frequent doses of morphine. She had no wound pain at all, perhaps because it was overshadowed by the epigastric pain and perhaps because she had had intravenous procaine during the operation. After a week of this pain a right splanchnic block was performed with 25 c.c. of 2% procaine and she obtained immediate and dramatic relief. This relief lasted for one week when she had a recurrence of the usual pain, distension and vomiting. She was given eighteen right splanchnic blocks with various agents including procaine, pontocaine, and nupercaine between October 12 and October 31 with periods of relief from each block varying from four to twenty hours. The patient literally cried for the blocks. She was also tried on a course of dilvasine without effect—as well as banthine, and later cortisone, also without effect. Intravenous alcohol and intravenous procaine were also tried, but without effect. By blocking the spinal nerves paravertebrally it was shown that the pain pathway was along the eighth thoracic and this therapy seemed as effective as the splanchnic blocks. In view of her general condition and the innumerable operations it was decided to inject the thoracic sympathetic chain and splanchnic nerves with 95% alcohol. This was done and she had four days' relief but unfortunately the pain then recurred. Posterior rhizotomy of thoracic VII, VIII, and IX nerves was then considered but not done. She gradually improved and was discharged early in January, 1951. She has been at home since doing her housework and getting an average of about 150 to 200 mgm. demerol daily. Although this patient is better than for some time, it is felt in retrospect that a cœliac ganglionectomy or a transthoracic splanchnectomy would have been wiser treatment.

The next two cases are included to demonstrate the importance of ruling out somatic pain before doing splanchnic blocks or neurectomies.

CASE 5

Miss E., age 37. Referred September 5, 1951. This thin, dark, rather tense but not overly intelligent woman had suffered from abdominal pain for two years. She had been fully investigated previously with entirely negative findings, and was referred for a splanchnic block as a preliminary to an exploratory laparotomy. She had had pain in the left lower quadrant for two years. This pain radiated around into the left loin at times (elicited by questioning). It had a very sudden onset originally and it was very severe and crampy at that time. It had been constant for the last one and one-half years and was gnawing and aching in character. It still varied in intensity and the really severe exacerbations would last until external heat was applied. The pain was worse on standing or walking and was relieved by sitting or lying down. Her appetite was poor when the pain was severe and she would feel nauseated also. The pain was worse if she needed to urinate (cystoscopy negative) and was relieved partially by urination or a bowel movement. She often felt a desire to defæcate but couldn't. Sometimes she was relieved by lying prone. The pain was not aggravated nor brought on by a respiratory infection.

Examination was entirely negative except for the back and abdomen. The painful area corresponded to the abdominal distribution of the twelfth thoracic and first lumbar dermatomes. This area was a little tender but there was no rigidity and no masses were palpable. The erector spinæ were found to be rigid on both sides but there was no obvious scoliosis nor lordosis. The legs were equal in length. There was an acutely tender spot about 1½" infero-lateral to the left posterior superior spine. This was infiltrated with 5 c.c. of 2% procaine. She had temporary relief with this injection along with relaxation of the erector spinæ on the left side and development of a slight scoliosis convex to the left in the lumbar region.

Two days later (September 7, 1951) paravertebral block of thoracic twelve and lumbar one nerve roots was performed with 2% procaine. This relaxed the erector spinæ muscle on the left side and completely relieved her abdominal pain, replacing the pain with an area of anæsthesia corresponding to the pain area and to dermatome segments T xii and L i. Immediately following this proctocaine 1 c.c. was injected into the aforementioned trigger area. Relief persisted following this therapy and the erector spinæ remained relaxed. She has been quite well and free of pain up until the present time (November 15, 1951). It seems that the painful area in this patient's buttock caused a reflex spasm of her erector spinæ which in turn caused some deviation of her spine with pressure on the nerve roots T xii L i, which produced

her only complaint which was of left sided abdominal pain.

CASE 6

Mrs. F., age 21. This patient was referred on October 4, 1951, for splanchnic block therapy for what was thought to be subacute pancreatitis. She had had intermittent abdominal pain for six months, starting about one month after the birth of her second child. She vomited frequently with the pain and constipation was severe. The pain was mostly epigastric and mostly right sided and it radiated around into the right loin and down over the right iliac crest. She was tender, with hyperæsthesia to light pinching in the above areas. The tenderness was more marked when her muscles were tensed. Her sedimentation rate and serum diastase were normal. Right sided splanchnic block (25 c.c. 2% procaine) gave moderate relief of her pain for two to three hours. This partial relief was thought, in retrospect, to be due to absorbed procaine producing analgesia of the spinal nerves. On October 10 a dilatation and curettage of the uterus and a dilatation of a spastic anus was performed as well as a sigmoidoscopic examination. While still under anæsthesia a paravertebral block was done from thoracic vi to lumbar iii inclusive. She had moderate relief of pain for about eight hours following these procedures, at which time the pain became exceedingly severe, especially in the epigastrium.

Intravenous procaine (750 mgm.—45 minutes) gave dramatic relief of all pain after about 150 mgm. had run in. The relief lasted until the next morning. She had the I.V. procaine repeated on three successive days during which time her local and general condition improved remarkably. So much so that she discharged herself on October 13.

She started to have lower abdominal pain on October 16. This radiated around into both loins. She was readmitted on October 28 and found to have an elevated temperature and sedimentation rate. She was tender in the lower abdomen and loins. This was worse when her muscles were tensed. There had been no recurrence of the upper abdominal pain and tenderness. She improved rapidly on I.V. procaine and penicillin therapy. Latterly, physiotherapy was started to correct a moderate lumbar lordosis which was thought to be the cause of her upper abdominal pain at least and probably of the lower abdominal pain as well, although this may have been due to a pelvic infection. She was discharged from hospital in good condition on November 7. For an understanding of lordosis and scoliosis as a cause of abdominal pain one is referred to "Pain Syndromes" by Judovich and Bates.[7]

DISCUSSION

The purpose of the present paper is to popularize a condition which is not uncommon and is certainly very serious and distressing. No claim to originality is made in as much as all the procedures outlined have been and are no doubt being done in several centres. The patients were disabled to a considerable degree and a great worry to all concerned. They had no future except possibly repeated futile laparotomies and eventual drug addiction. The concept of splanchnic pain *per se* allowed definitive diagnostic and therapeutic procedures to be carried out. The origin of the syndromes most probably must be sought within the concept of abnormal or perverted physiological processes. The case of Mr. C is a pointer in this direction. Severe abdominal pain caused by gross disease became selfperpetuated. The other cases of cœliac ganglion syndrome are not so clear perhaps but they all had some abdominal visceral disease originally. All the cases reported here were right sided originally, but left sided versions of the syndrome can undoubtedly occur. Also, unrelieved severe one sided pain can and probably will involve the contralateral side eventually. After unilateral splanchnectomy or cœliac ganglionectomy, the pain of visceral disease will still be felt, but it will have a higher threshold and will be felt on the opposite side of abdomen only.[5] It is essential to carefully evaluate the pain in these cases and to rule out visceral disease by all possible investigations. It is also very desirable to rule out somatic pain by differential nerve blocking, where indicated, if the procedure of neurectomy for abdominal pain is not to fall into disrepute.

From experience with the above and other cases it is felt that intravenous procaine therapy is a valuable method of differentiating between somatic and visceral abdominal pain. Somatic pain is often relieved, sometimes dramatically, whereas visceral pain is almost completely unaffected. Paravertebral nerve blocking in the thoracic region will often block visceral as well as somatic pain pathways which can be misleading. Conversely a splanchnic block may result in anæsthesia of somatic nerves, especially T xi, T xii or L i by direct diffusion.

Whether to do a splanchnectomy transthoracically or a cœliac ganglionectomy transabdominally is a difficult question. The abdominal route allows one to examine the viscera for disease, but the neurectomy may be incomplete. The thoracic route allows a more definitive neurectomy, but the postoperative intercostal neuralgia may be very discouraging to those patients who have had so much pain already and, if the pain is in the same area as the preoperative pain, then confidence may be lost.

The following points may help one to diagnose these cases.

1. Severe chronic abdominal pain without demonstrable pathology.

2. Multiple laparotomies — reflecting attempts to find pathology and in some cases actually precipitating the syndrome.

3. The pain is usually right sided.

4. Despite the severe pain, vomiting and sometimes abdominal distension, the patient's hydration and nutrition is surprisingly well maintained.

5. The pain and tenderness is deep rather than superficial.

6. The patients are young, dark, thin, intelligent, rather tense individuals.

7. Difficulty in voiding seems to be a common feature.

8. Respiratory infections aggravate and precipitate the condition at times.

9. Complete and almost instantaneous relief with splanchnic block.

10. The pain always *precedes* other signs and symptoms.

It is important to understand that somatic pain often has a visceral overflow component (*e.g.*, Miss E), due on ocasion, perhaps, to a reflex activation of the internuncial neurons of the spinal cord and at other times due to paravertebral nerve root irritation affecting the sympathetic as well as the somatic nerve fibres. At other times again the visceral symptoms accompanying somatic pain syndromes may be a psychogenic response to an unpleasant situation. Conversely, cases with visceral pain syndromes often have somatic painful tender areas and some muscular rigidity. This can be interpreted on the basis of spinal cord reflexes with perhaps some voluntary or involuntary psychogenic component.

Psychological aspects of these cases are important. Most of these patients had been seen by a psychiatrist at one time or another, or had been told that they should see one. It is not surprising that these people should have some psychoneurotic overlay after all they have been through. It is also not unlikely that nervous tension of one kind or another can initiate the pain or aggravate it when present. This occurs by what Dr. Livingstone calls "facilitation".[8] It cannot be too strongly stressed, however, that these cases are primarily abdominal visceral pain syndromes and that psychotherapy without removing or blocking the pain pathways will not only waste the psychiatrist's time but will at times infuriate the patient.

Postoperatively these patients may have some postural hypotension which can be controlled by a vaso-constrictor. If a bilateral denervation has been done the patient will not have any pain with visceral disease until the parietal peritoneum is involved. Painless appendicitis could occur although this organ has usually been removed previously. Bowel obstruction would have its other signs to make the diagnosis. A perforated viscus would cause immediate pain by stimulation of the parietal peritoneum. Although the viscera are rendered insensitive by bilateral sympathetic denervation, the patients may still have "heart burn" which is œsophageal, or a feeling of bloating or even mild cramps which are thought to be pelvi-rectal in origin.[5] Bowel function is unaffected.

Other conditions for which splanchnic blocks are indicated are, paralytic ileus, acute or chronic pancreatitis and tabetic crises. An alcohol block of the cœliac ganglia may be done for inoperable hopeless carcinoma cases.[6] Splanchnic or stellate blocks can be invaluable in differentiating abdominal visceral pain from cardiac pain.

Technique.—Splanchnic block is performed by the posterior route with the patient in the lateral position with the affected side up and a small pillow under the dependent loin. A 10 cm. No. 20 or No. 22 gauge needle is inserted at the junction of the lateral border of the sacrospinalis muscle with the lower border of the twelfth rib, opposite the first lumbar vertebra. The needle is inserted at an angle of about 45° from the sagittal plane and advanced until the body of the first lumbar vertebra is contacted. The needle's depth is noted and then withdrawn to the subcutaneous area and redirected so as to just clear the antero-lateral aspect of the vertebra, usually at a depth of about 8 or 9 cm. Twenty to twenty-five c.c. of local anæsthesia solution (*e.g.* 2% procaine) are now injected (there should be no resistance to the plunger), being careful to aspirate as the needle could be in the vena cava or the aorta. With reasonable care the procedure is neither especially difficult, painful, nor dangerous.

The author acted as a consultative pain therapist and gave the anæsthetics for the preceding cases. He wishes to thank all those doctors who participated in the treatment of these patients for their co-operation.

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Canad. M. A. J.
Oct. 1952, vol. 67

THE ROLE OF THE SEDIMENTATION RATE IN THE DIAGNOSIS OF MALIGNANCY

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THE ERYTHROCYTE sedimentation rate (E.S.R.) is a test which is simple to perform and has come to be widely used since Fahraeus[1] first showed its value as a diagnostic adjunct in 1921. In spite of this there is still some doubt as to the significance of a single raised reading in determining the presence of disease. There is a general agreement as to its usefulness in assessing the activity of diseases such as rheumatic fever, rheumatoid arthritis and tuberculosis. The appraisal of any laboratory test must depend on the results obtained by average people and not only on the results obtained by experts.

The E.S.R. has been used as a routine test in the Regina Cancer Clinic for some three years. Although there must be some suspicion of malignancy in cases referred to the clinic, for various reasons more non-malignant than malignant cases are seen (Beresford & Watson).[2] As a result the E.S.R. has been recorded in a heterogeneous collection of conditions in which it would not have been done in the ordinary course of events. This affords an opportunity for a comparison of the results in the malignant and non-malignant conditions.

All patients seen in this clinic are investigated and followed very carefully and, in the event of a mistaken diagnosis, the clinic is very promptly informed. For this reason it is doubtful if any of the cases utilized in this review were incorrectly diagnosed.

The sedimentation rates in an unselected series of 2,723 patients are analyzed in this report. 1,045 were in patients suffering from malignant disease and 1,678 in patients suffering from some other disease, or in whom no disease could be found after full investigations.

The malignant cases were diagnosed at operation, by biopsy, at postmortem, and in a small proportion of cases on clinical grounds.

The Westergren method was used for the test. 4.5 c.c. of venous blood were mixed with 0.5 c.c. of a 3.8% solution of sodium citrate. Readings were taken at 15 and 45 minute intervals but the figures of the 45 minute reading only are analyzed.

Table I shows the percentage number of patients in which the E.S.R. was raised above 10, 20, and 50 mm. For comparison the corresponding figures are given for non-malignant diseases affecting the same organ in Table II.

Although the figures show the E.S.R. to be more frequently raised in the malignant cases, in no instance was it consistently raised in all cases. To be of any real value in diagnosis not only would the results have to be consistently high in the malignant cases, but a normal E.S.R. would have to be present in the disease which simulates the cancer. This is far from so in this series of results. Rydén[3] investigated the value of the test as a means of differentiating carcinoma of the stomach from simple ulceration and came to the conclusion that it had no practical value. He also found that a normal E.S.R. was not infrequently found when the growth was inoperable.

TABLE I.

Site of cancer	*Number of cases*	*% number above 10 mm.*	*% number above 20 mm.*	*% number above 50 mm.*
Stomach	142	76.8%	59.9%	25.4%
Bowel	141	80.1%	65.2%	19.9%
Breast	124	69.4%	48.4%	5.6%
Prostate	63	82.5%	71.4%	25.4%
Skin	72	52.8%	31.9%	2.7%
Lung	72	88.9%	69.4%	31.9%
Cervix	45	86.7%	62.2%	13.3%
Uterus	46	76.1%	63.0%	17.4%
Bladder	38	81.6%	61.0%	13.2%
Ovary	36	83.3%	66.6%	13.9%
Gall bladder	24	91.7%	58.3%	37.5%
Pancreas	22	86.4%	59.1%	22.7%
Thyroid	13	92.3%	92.3%	30.8%
Kidney	14	64.3%	57.1%	28.6%

TABLE II.

Site of lesion	*Number of cases*	*% number above 10 mm.*	*% number above 20 mm.*	*% number above 50 mm.*
Stomach	251	48.6%	23.9%	5.6%
Bowel	85	58.8%	42.4%	9.4%
Breast	181	44.2%	17.7%	0.6%
Prostate	52	51.9%	38.5%	9.6%
Skin	68	30.9%	30.9%	1.4%
Lung	60	70.3%	63.3%	28.3%
Cervix	95	67.4%	36.8%	4.2%
Uterus	58	70.3%	40.0%	8.6%
Bladder	15	73.3%	60.0%	33.3%
Ovary	21	66.6%	33.3%	22.2%
Gall bladder	68	76.8%	60.3%	20.6%
Pancreas	6	66.6%	66.3%	16.6%
Thyroid	15	60.0%	46.7%	20.0%
Kidney	16	81.3%	75.0%	25.0%

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The remaining group of cancer cases is too small to be of any value in the analysis. However it can be noted that in eight cases where secondary deposits were found but the primary was not identified, the E.S.R. was appreciably raised in all cases. In 21 cases of leukæmia the E.S.R. was raised in all but four but the diagnosis would be made by other means. The same remarks apply to the 21 cases of lymphosarcoma where the E.S.R. was raised in 17. Varying results were obtained in malignant lesions of the parotid (13), œsophagus (8), pharynx (7), vulva (6), bone (5), testes (5), antrum (6), and thymus (2). In 12 cases of myelomatosis the E.S.R. was raised in 10.

In this series there remain a large and important group of cases in which either no organic disease was found or a functional disorder diagnosed. Included in this group are cases in which a symptom such as dyspepsia, constipation, menorrhagia, was recorded as the diagnosis. These merit further study as it is in this group that the finding of a raised E.S.R. may have its greatest value as an indication of disease which the usual methods of investigation have failed to demonstrate. Various figures have been given as representing an abnormal E.S.R. by the Westergren method. As these figures were read at the end of 45 minutes and not one hour they would be expected to be rather low. Some authorities regard a figure of above 10 mm. in one hour as abnormal, some 15 mm. and some 20 mm. in one hour. Nichols[4] considered that importance should only be attached to a figure above 30 mm. per hour.

Of the 552 cases in this group, no fewer than 217 (39.3%) had an E.S.R. above 10 mm. in 45 minutes. It was above 30 mm. in 106 (19.2%) patients and above 50 mm. in 17 (3.1%).

It is inconceivable that organic disease was not diagnosed in such a high proportion of cases. The technique of the test is simple and a study of the method used failed to reveal any defects.

It can be concluded from these results that the E.S.R. is of little value in the diagnosis of cancer as it is normal in too great a proportion of proved cases, and raised in too many diseases that simulate cancer. As an index of the presence of organic disease the test would appear to be capricious and too much emphasis should not be put on a single abnormal result.

Recent reports by Goldberg *et al.*,[5] and Gilmour and Sykes,[6] have noted a discrepancy between the results obtained by the Westergren and by the Wintrobe method. The higher readings were obtained by the Westergren method and as these were more in keeping with the clinical picture, they suggested the Wintrobe method may be misleading. In view of the findings in this report, it may be that it is the Westergren method which is misleading. Further investigation is required to clarify the position.

SUMMARY

1. The sedimentation rates of an unselected series of 2,723 cases are analyzed and comparison made between the rates in malignant diseases and non-malignant diseases.

2. The conclusion is reached that the test is of no value in establishing the presence or absence of malignant disease, and may be misleading as an indication of the presence of organic disease.

3. In view of the high results in this series of cases using the Westergren method it is suggested that the Wintrobe method may be more reliable.

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APPENDIX

This report would not be complete without indicating the various diseases included in the non-malignant cases (Table II) which were investigated on suspicion of malignancy. These figures may also prove of interest as an indication of the diseases that may be mistaken for cancer.

Stomach.—Peptic ulceration (231). Gastric polyp (8). Gastritis (7). Hiatus hernia (3). Cardiospasm (2). Duodenitis (1).

Bowel.—Diverticulitis (or -osis) (36). Hæmorrhoids (19). Rectal polyp (5). Proctitis (5). Anal fissure (4). Adhesions (3). Acute enteritis (3). Ulcerative colitis (3). Ulcer of rectum. (2) Mucous colitis (2). Steatorrhœa (1). Crohn's disease (1). Polyposis coli (1).

Breast.—Cystic hyperplasia (81). Mazoplasia (27). Fibroid breast (8). Cystic mastitis (11) Fibroadenoma (28). Cystadenoma (2). Mastopathy (9). Breast abscess (9). Duct papilloma (4). Gynæcomastia (2). Galactocele (1). Lactorrhœa (1).

Prostate.—Simple prostatic hypertrophy (51). Prostatitis (1).

Skin.—Leucoplakia (24). Nævus (12). Lipoma (10). Sebaceous cyst (4). Keloid (2). Papilloma (5). Hyperkeratosis (4). Warts (4). Pruritus vulvæ (3).

Lung.—Bronchiectasis (12). Chronic bronchitis (15). Unresolved pneumonia (8). Sarcoidosis (3). Dermoid (3). Aneurysm (2). Simple cyst (2). Empyema (1). Asthma (2). Lung abscess (3). Moniliasis (1). Pleural effusion (4). Pulmonary tuberculosis (4).

Cervix.—Cervical erosion and cervicitis (82). Cervical polyp (10). Vaginitis (2). Prolapse (1).

Uterus.—Fibroids (40). Pelvic abscess (5). Cystic hyperplasia (8). Ectopic gestation (1). Pregnancy (4).

Bladder.—Pyuria (4). Papilloma (7). Cystitis (4).

Ovary.—Ovarian cyst (21).

Gall bladder.—Cholecystitis (31). Cholelithiasis (25). Stone in common bile duct (12).

Pancreas.—Pancreatic cyst (1). Chronic pancreatitis (5).

Thyroid.—Thyrotoxicosis (6). Thyroid adenoma (9).

Kidney.—Renal calculus (10). Pyelonephritis (5). Hydronephrosis (1).

THE ANÆSTHETIST'S ROLE IN TONSILLECTOMY AND ADENOIDECTOMY

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TONSILLECTOMY and adenoidectomy have erroneously been considered relatively minor operations. They are undertaken by all categories of the medical profession, from the general practitioner to the general surgeon. In smaller centres with "open" hospitals, very few of these cases are referred to the otolaryngologist.

Few other surgical operations have more exponents of individual techniques and modifications of techniques, and, likewise, no other surgical venture has been more criticized by the medical contributors to the lay press. These latter criticisms are not entirely without some justification, because they are based on reviews and opinions of tonsillectomists who contribute articles to the medical periodicals. These latter contributors concern themselves with improved techniques and methods to obtain adequate exposure during the operation. In addition, they concern themselves with methods to control the immediate surgical complications such as bleeding, and the subsequent complications such as residual tags which may affect the patient's health as adversely as the infected tonsils did prior to the surgery.

It is the latter complication that has been so thoroughly discussed and stressed by T. L. Hyde.[4] He found residual tags in 68% of 1,000 tonsillectomized patients picked at random. There were residual tags in 64% of tonsillectomized patients who believed that their surgeon was a specialist He believes that irrespective of any considerations of the indications for tonsillectomy and its possible benefits, complete removal of tonsil tissue is imperative to justify the operation. This must be the goal of every tonsillectomist whether he be a general practitioner or a specialist, and an end result which every patient undergoing a tonsillectomy has every right to expect.

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There may be some justification for residual tags where tonsillectomies are performed in rural areas with limited facilities and anæsthesia, but where modern endotracheal anæsthesia is available this complication is less excusable. Despite this, it is not an uncommon practice in some larger centres to utilize modern anæsthesia for most of the surgical ventures, whereas, the tonsillectomy anæsthesia is relegated to the inexperienced intern or resident who has as his choice of methods the open ether asphyxiation technique or some modification of it.

SURGICAL CONSIDERATIONS

Whether it be a child or an adult, there are many inherent difficulties associated with the operation of tonsillectomy. The exposure is limited by the size of the mouth, and is even more complicated in patients who have a tendency to a receding jaw. In these latter cases, any attempt to move the tongue away from the field of the operation will tend to shut off the airway completely. Illumination is always a difficult problem because it can only come from one direction. Hæmostasis is particularly difficult to accomplish when one considers the depth at which ligatures have to be tied, this being even more difficult to accomplish when the throat is filling with blood and secretions and the patient is tending to strain or lighten to the stage of swallowing and coughing.

The ever-present problem of bleeding is more anticipated in the adult patient because of the presence of chronic inflammatory scar tissue in and around the tonsil. However, the child is liable to bleed just as profusely and is less able to withstand and compensate for blood loss. In these young patients, the small mouth creates a special problem for manipulating hæmostats and ligatures.

Because of the above mentioned considerations, many tonsillectomists approach a tonsillectomy with a great deal of trepidation. This is especially true when they are confronted with methods of anæsthesia which cannot assure them of absolute minute-to-minute control of the patient and the complications of the operation.

Canad. M. A. J.
Oct. 1952, vol. 67

ANÆSTHETIC CONSIDERATIONS

MacIntosh and Bannister[5] state that all anæsthesia should be predictable, controllable, reversible, non-toxic and have a high therapeutic quotient. These considerations applied to tonsillectomy can only be fulfilled by the use of endotracheal anæsthesia. Children who are subjected to tonsillectomy are special problems for anæsthesia. The margin of safety in these youngsters is considerably less than it is in adults. Because of the site of operation and its potential complications, the problems of hypoxia, anoxæmia, convulsions, excessive bleeding and respiratory and circulatory collapse are more likely to occur. These added risks are imposed on any child who is not given the benefits of endotracheal anæsthesia.

No doubt, these factors often determine the length of the operation and many tonsillectomists are forced to work as rapidly as possible to complete the operation in the face of the above mentioned complications. This combination of circumstances can only result in the high percentage of residual tags following tonsillectomies.

Additional hazards to anæsthesia are encountered in these young candidates for tonsillectomy when one considers that repeated attacks of tonsillitis may result in a debilitated anæmic child who may be underweight and undernourished. These children often cannot be "built-up" until the infected tonsils are removed. Endotracheal anæsthesia offers these youngsters the best measure of safety and ensures the tonsillectomist of complete control of the situation during the operation—regardless of the time required to complete it.

Many of these pale flabby youngsters with hypertrophied lymphoid tissue and enlarged thymus glands are especially prone to sudden collapse and death during anæsthesia. Leigh and Belton[6] state that since this calamity was not seen once in their series of 18,000 anæsthetics administered to infants and children, it must be assumed that status lymphaticus is a scapegoat which covers a multitude of anæsthetic and surgical sins. Others deplore the diagnosis of status lymphaticus and claim that deaths in these cases are the result of poor management of the anæsthesia and relative over-dosage of anæsthetic drugs administered to a hypersensitive child. Endotracheal anæsthesia offers the best measure of safety and protection to these children.

It is now generally accepted that the available laboratory tests utilized to rule out the "bleeders" are of little value and may be misleading. Merskey[3] states that even true hæmophilics may have a normal coagulation time. Complete control of anæsthesia in these cases affords the tonsillectomist the best and maybe the only chance to stop the bleeding. Postoperative complications such as pneumonia, atelectasis and lung abscess are best obviated by the utilization of careful endotracheal anæsthesia. This method of anæsthesia presents ideal operative conditions for both the novice and the experienced tonsillectomist. This bears out the general principle that a good surgeon deserves a good anæsthetic and a poor surgeon needs one.

The advantages of endotracheal anæsthesia are many. It provides absolute minute-to-minute control of the patient and the operative field for the tonsillectomist. It ensures a patent airway; adequate oxygenation; even plane of anæsthesia; adequate protection against the aspiration of mucus, blood and detritus and provides the surgeon with ideal conditions for careful dissection of the tonsils and control of the bleeding.

Many anæsthetists prefer the orotracheal route which implies direct vision intubation with the use of the laryngoscope. This is, no doubt, an excellent method and technique which provides all the advantages of endotracheal anæsthesia for the patient. However, like all techniques, it also has many disadvantages. With this method, the tube definitely encroaches upon the operative field and this is especially true in the case of the small child. This is looked on with disfavour by many tonsillectomists. Because they have to become accustomed to the presence of this tube in the mouth and must adapt their technique to work around it, many tonsillectomists will deplore the use of it by the anæsthetist. Furthermore, the orotracheal route of intubation is more likely to dislodge the loosened deciduous teeth of the younger child and chip or fracture the secondary teeth of the older child. Intubation by this technique requires a deeper plane of anæsthesia than is necessary for the operation itself. After intubation, this route presents more difficulty to the anæsthetist in his attempt to fix the tube and prevent accidental extubation.

In contrast, nasotracheal intubation fulfils all the advantages of endotracheal anæsthesia for tonsillectomy and obviates most of the abovementioned disadvantages attributed to the oro-

tracheal route. Nasotracheal intubation may be carried out by the direct vision method or the "blind" method. The latter is preferred because it can be performed in the first plane of the third stage of anæsthesia and is, therefore, a much faster method.

When a number of tonsillectomies are to be performed, blind nasal intubation will enable the anæsthetist to keep up to the surgeon. With some experience and practice, the intubation can be completed in from five to eight minutes from the commencement of the anæsthesia. Direct vision nasotracheal intubation will take longer to do and is comparable to orotracheal intubation in that respect. However, the nasotracheal technique removes the tube from the operative field and allows for better fixation of this tube. With this accomplished, the anæsthetist's hands are free to operate the suction, hold the tongue-depressor and, if necessary, assist the surgeon to suture the bleeders.

There are some disadvantages associated with the use of the nasotracheal blind or direct vision technique of intubation for tonsillectomy. One might consider that the technique appears to complicate the adenoidectomy stage of the operation in the child. In our series of cases this stage of the operation was carried out after extubation. After the tonsils are dissected out and the bleeding from the fossæ is completely stopped, the throat is sucked clean of secretions and blood. With the aid of the laryngoscope, the base of the tongue is now elevated to expose the entrance to the glottis and this area is checked for presence of blood clots and secretions. The suction tip is then detached from the tubing and the latter is connected to the adapter of the endotracheal tube. Extubation is now promptly carried out with intermittent suction being applied to the endotracheal tube. This method ensures the removal of any secretions in the trachea, and prevents the possibility of aspiration of any blood or blood clots which may have been lurking at the entrance to the glottis.

With all tonsillar bleeding completely controlled in a patient who has reached a state of equilibrium in anæsthesia, the surgeon is presented with at least five minutes of ideal operating conditions in which to perform the adenoidectomy. Bleeding from this stage of the operation is easily controlled by suction and intermittent packing of the nasopharynx. Since this stage of the operation is usually completed in a few minutes, there is little chance of the patient lightening to the stage of straining and breath-holding. As soon as the adenoidectomy is completed, the patient is turned on his side to ensure against the possible aspiration of any blood or secretions.

Many other arguments have been advanced against blind endotracheal intubation. It has been said that this method is difficult, uncertain, traumatic, and more liable to infect the respiratory tract. Gillespie[7] in his article on blind nasotracheal intubation claims that the likelihood of doing harm must be less with a piece of flexible rubber tubing than a metal laryngoscope blade. He also states that blind nasal technique is followed by slightly fewer major respiratory complications than the laryngoscopic techniques. His statistics favour blind intubation when both major and minor respiratory complications are considered.

Furthermore, anyone who has done blind intubations can hardly disagree with Gillespie's claim that blind intubation is usually easy in subjects in whom laryngoscopy is difficult. With a little practice and experience the anæsthetist will accomplish blind intubation in over 90% of his patients.

In our series of 650 cases, blind intubation was easily accomplished in 90% of the subjects. The remaining 10% necessitated the use of the laryngoscope to complete the procedure. In this latter group, it was found that excessive deviations of the nasal septum and constrictions of the nasal passages were the chief reasons for failure to intubate blindly. When these complications did not exist, the adenoids themselves presented no barrier or difficulty to the intubation. Blind intubation was relatively more difficult to perform in children under three years of age. This is probably explained by the fact that the larynx is situated much higher in this age group. In this series of 650 cases, there were 560 children (under 12 years) and 90 cases in the age group of 12 years old and over.

Generally speaking, a healthy child tolerates morphine well. Suitable adjustments in morphine dosage were made for the debilitated child. Atropine was performed for its mild stimulating rather than depressing effect on the higher centres. With the dosages described above, the drying effect on pharyngeal secretions was found to be adequate. The premedication was given one hour before the operation.

INDUCTION

Vinethene was preferred for induction in children four years old and younger. This was facilitated by having the child "blow" through the mask while vinethene is slowly dropped on it. Even an unco-operative child can be persuaded to blow through the mask for a minute or so without struggling and fighting. Vinethene is a potent agent which has a wide margin of safety between respiratory and cardiac arrest.

Mild convulsive movements were noticed during the induction with vinethene in six cases. It was difficult to say whether these were caused by the agent or the hyperventilation resulting from the "blow through the mask" technique. probably both factors were responsible. These convulsions were easily controlled by simply removing the mask and giving oxygen and artificial respiration if cyanosis developed.

TABLE I.

PREMEDICATION

Age	*Morphine*	*Atropine*	*Hyoscine*	*Codeine*	*Nembutol*
0 to 6 mos.	..	1/350	..	..	..
6 mos. to 1 year	..	1/300	..	..	gr. ¼
1 to 2 years	..	1/250	..	gr. 1/8	..
2 to 4 years	..	1/200	..	gr. ¼	..
4 to 6 years	1/20	1/150	..	..	..
6 to 8 years	1/16	1/150	..	..	..
8 to 10 years	1/12	1/150	..	..	..
10 to 12 years	1/8	1/150	..	..	..
12 to 14 years	1/6	1/150	..	..	gr. ¾ at H.S
14 and over	1/6	..	1/150	..	gr. 1½ at H.S

Subjects over the age of four were usually induced with intravenous pentothal. The dosage employed was ¾ of a c.c. of a 2½% solution per year of age up to the age of 12. Following the injection of pentothal, the induction was completed with vinethene. Except for the odd case, suitable veins were found in these subjects if not at the elbow then on the back of the hand or the front of the wrist. Where a suitable vein was not found, vinethene alone was used for the induction.

Subjects twelve years old and over were induced by the "crash" induction method. The 12 to 16 year old group was induced with about 15 c.c. of 2½% pentothal and 2 c.c. of syncurine. The 16 and over age group were induced with 20 c.c. of 2½% pentothal and 2 to 3 c.c. of syncurine. These cases were usually ready for blind intubation in 3 to 5 minutes after the injection. The syncurine was given separately following the pentothal to avoid undue respiratory depression. If the latter occurred, oxygen by mask and assisted or controlled respiration measures (squeezing the bag) were used to restore the respirations.

INTUBATION AND MAINTENANCE

In the younger age group (up to 12), after induction was carried out with either vinethene alone or intravenous pentothal and vinethene, the open ether technique was utilized to carry them down to the lower border of the first plane of the third stage of anæsthesia. This plane or the upper border of the second plane was found suitable for blind intubation.

Endotracheal tube sizes and lengths used in this series correspond closely to the recommendations of Leigh and Belton.[6] A suitable length for the tube was found to be 1¼ times the distance from the tragus of the ear to the tip of the nose in children up to four years of age, and 1½ times the distance from the ear to the nose in the age group four to twelve. In the age group over twelve, the length of the tube varied from 1½ to 2 times the distance from the ear to the nose.

The patient's head was placed in the bronchoscopic position prior to the intubation. This position consisted of some flexion of the neck and hyperextension of the head and was facilitated by the use of a sand bag under the shoulders. In the majority of cases, adequate conditions for blind intubation were achieved by simply extending the head.

The following tube sizes were used:

Age	*Magill size*
9 to 18 months	1
18 months to 2½ years	2
2½ to 5 years	3
5 to 8 years	4
8 to 10 years	5
10 to 12 years	6
Over 12 years	7

The patient's head having been manipulated into the required position for blind intubation with the left hand, a lubricated endotracheal tube of suitable size and length is picked up between the index finger and the thumb of the right hand and is gently guided downward and forward along the inferior meatus of the right nostril. In some patients the left nostril will be anatomically more suitable for the introduction of the tube. Any minor obstruction can be overcome by gentle rotation of the tube during its descent. Occasionally a rotation of 180° is required to complete the descent of the tube through the meatus. When the tube reaches the nasopharynx, further obstruction to its descent may be encountered. When this occurs, it is usually due to the fact that the tip of the tube is striking the nasopharynx at an angle of 90° or more. Gentle rotation of the tube and further extension of the head may be required to pass this obstruction. Once the tube has been guided past the above-mentioned potential barriers, the possibility of inflicting trauma on the respiratory passages is negligible.

Before the tube is introduced into the larynx one carefully listens for breath sounds by placing the right ear close to the adapter of the tube. This procedure not only helps to guide the tube in the right direction but also detects the presence of any secretions which may have collected in the tube or at the entrance to the glottis. If secretions are detected, the suction tip is introduced into the back of the throat to clear them and, if necessary, the suction tubing is connected directly to the adapter of the tube to accomplish this. If blood is detected in the secretions, the laryngoscope is used to view the entrance to the glottis and any such blood or blood clots are sucked out before intubation is completed.

The final step in blind intubation concerns the introduction of the endotracheal tube into the glottis and trachea. If the glottis is irritable and closed, the tube is directed towards the entrance to the glottis and held there until the ventricular folds and cords open up. A valuable sign which helps one to detect the presence of the tip of the tube at the glottic opening is the quivering sensation transmitted to the right index finger and thumb by the closed ventricular folds of the larynx. In this series of cases vinyl plastic tubes were used throughout.

After intubation, maintenance of the anæsthesia in the age group of 12 and over was effected by the mixture of cyclopropane, nitrous oxide and oxygen. A Heidbrink closed circuit apparatus was used for this group.

In the younger age group, the semi-closed anæsthetic technique was utilized. Maintenance of the anæsthesia was effected by the use of the cabinet model ether blower which was converted to a semi-closed ether machine by the introduction of a three litre bag and expiratory valve into the circuit. The forced air tubing was disconnected from the ether bottle of the apparatus and an oxygen tank with a litre flow gauge was connected up in its place. These oxygen tanks are standard equipment in all hospitals and are used in the wards to supply oxygen through a B.L.B. mask.

A flow of three to four litres of oxygen over the surface of the ether was usually sufficient to maintain anæsthesia, and prevent carbon dioxide accumulation in the two to five year old group. In the age group five to twelve, higher rates of flow of oxygen are required, and the plunger of the ether bottle may have to be depressed below the surface of the ether to effect adequate maintenance.

An apparatus which serves just as well as the converted ether blower is a source of oxygen connected to a series of two ether bottles. The bottle connected to the source of oxygen contains a few ounces of ether which is vaporized by the flow of oxygen through it. An empty bottle is connected to this circuit to act as a trap for any liquid ether that may be carried over from the first bottle. The outflow tubing from this second bottle is connected up to a three litre bag and the latter is connected to the adapter of the endotracheal tube. An expiratory valve is interposed between the bag and the adapter. This apparatus can be easily constructed in any institution which has a source of oxygen. The only additional materials required are two ether bottles, two double-holed rubber stoppers which fit these bottles, four pieces of glass or metal tubing to fit the holes in the rubber stoppers and suitable lengths of rubber tubing to connect the oxygen tank to the first bottle and the three litre bag to the second bottle. This improvised technique is probably not a new idea because it was suggested to me by an operating room nurse some years ago.

COMPLICATIONS

Anæsthetic complications were conspicuous by their absence except for the six cases of minor convulsions occurring during the induction with vinethene. Minor respiratory complications such as sore throat were not considered because it was impossible to exclude the operation as a causative factor. One major complication occurred in a 12 year old patient. This boy was readmitted on the fourth day postoperatively with signs and symptoms of bronchopneumonia. It was felt that this could be a case of aspiration pneumonia. He responded rapidly to penicillin therapy, and made a complete recovery.

The majority of the patients in the age group of 12 and under were discharged from the hospital within 48 hours after surgery. The older age group were usually discharged on the third postoperative day.

There were five cases of secondary hæmorrhage in the age group under twelve, despite the fact that there was no visible bleeding from the tonsillar fossæ after the tonsillectomy. They were all re-intubated for suture of the secondary hæmorrhage. The bleeding vessel was found in the lower pole of the tonsillar fossa in four cases. The fifth case bled from the adenoid area and a post-nasal pack was required to check it. These secondary hæmorrhages occurred within 48 hours after the tonsillectomy. There was one secondary hæmorrhage in the age group over 12, and this was resutured promptly.

One was impressed with the absence of residual lymphoid tissue and tonsil tags in the cases from this series who were seen again in the past year. Since only a small number of the cases from our series were rechecked to date, statistical conclusions on that issue are not possible.

SUMMARY

1. The anæsthetist's rôle in facilitating tonsil operations is stressed.

2. A tonsillectomy should rid the patient of all tonsil tissue in order to justify the procedure.

3. The advantages of blind nasal intubation are discussed.

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CASE REPORTS

REPORT OF A NEWCASTLE DISEASE VIRUS INFECTION IN A HUMAN OF "FIELD" ORIGIN

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REPORTS OF THE NEWCASTLE disease virus of poultry affecting humans have been published previously from several countries.[1 to 4] Most of these reported infections have been of laboratory origin. Few have been reported with their origin in actual field outbreaks of Newcastle disease in poultry. The following case history cites an example of a human infection with Newcastle disease virus apparently contracted directly from poultry on the farm.

The patient was a woman of fifty-six, the wife of a farmer in the Edmonton area of Alberta.

History.—The patient purchased a group of baby chicks, approximately one week of age, from a local hatchery. One of the birds was ill upon arrival at the farm. Two days later all of this group of birds were ill with symptoms of gasping, coughing and sneezing. Some evidence of torticollis was also apparently noted. These symptoms, suspicious of Newcastle disease, rapidly spread to older birds on the same premises. When the condition started in the baby chicks, the patient compassionately held each newly stricken chick against her cheek in an effort to comfort it, thus giving ample opportunity for conjunctival and respiratory exposure, if the illness was Newcastle Disease.

On June 13, 1951, one week after the baby chicks were bought the patient's eyes became uncomfortable. After bathing with boracic acid solution, the discomfort gradually lessened. On June 17, four days later, an exacerbation of the conjunctivitis occurred, accompanied by exquisite conjunctival pain, headache and malaise. The symptoms increased and prompted her to seek medical aid on June 18.

Examination revealed infection of the conjunctiva (this being most marked in the right eye), and a low grade fever. Saline conjunctival washings were taken for virus examination and the patient immediately hospitalized.

Treatment.— On admission to the hospital, the patient was treated with aureomycin orally and also locally by means of ophthalmic ointment. Response to the drug was not gratifying, although the patient's condition did gradually improve. Aureomycin was discontinued after one week and treatment was continued with ophthalmic sodium sulfacetamide. This appeared more effective. Within four or five days the patient was free from pain. The photophobia and conjunctival infection had almost disappeared. During the second week after admission unexplained areas of ecchymosis appeared over both anterior tibial regions.

Routine laboratory findings.—Blood readings approximately one week apart, as given in Table I, are not outstanding.

An unexplained inversion of the albumin-globulin ratio of 1:5 was noted on June 27. However, a week later this reading was: albumin 4.3 gm. %, globulin 3.2 gm. %, with a total serum protein of 7.5 gm. %. Cephalin flocculation at this time was negative.

Urinalysis was consistently negative and non-protein nitrogen level was within normal limits.

In the majority of cases published on human Newcastle Disease virus infection, the condition appeared to be quite transient, lasting from twenty-four hours to several days. This patient, however, had to be hospitalized for nineteen days before her condition justified release from the hospital. The patient's condition was somewhat complicated by her mental attitude, in that she was convinced she would not recover and her fate would be similar to that of some of her chickens so affected; *i.e.*, torticollis, paralysis or death. This fixed idea was changed only with great persuasion and her gradual recovery. Even upon discharge from the hospital, although appearing well, she was reticent to admit the fact. Two weeks after release from the hospital, however, the patient was feeling well and carrying on with her work at home.

TABLE I.

BLOOD READING NEWCASTLE DISEASE PATIENT

Date 1951	*R.B.C.*	*W.B.C.*	*Polymorphs.*	*Lymphocytes*	*Eosinophiles*	*Monocytes*	*Hæmoglobin*	*Sedmintation rate per hour*
June 19.....	4,250,000	6,750	50%	49%			78%	
June 25.....	4,110,000	6,100	42%	54%			83%	
July 2.....	5,200,000	5,250	61%	34%	2%	3%	81%	3.5 m.m.

VIRUS AND SEROLOGICAL EXAMINATIONS

Conjunctival washings from the patient were taken June 18. This sample was frozen and shipped by air express for Newcastle Virus examination to the Animal Disease Research Institute at Hull, Quebec. A report was received on June 23 indicating that the virus of Newcastle disease had been isolated from the specimen.

Blood samples from the patient were taken on opproximately June 23, July 7 and July 23, representing ten days, three and six weeks after she first noticed conjunctivitis. Serum was removed,

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frozen and submitted to the Animal Diseases Research Institute. The virus was not recovered from any of the blod serum, neither was there any indication of neutralizing antibodies on the hæmagglutination inhibition or serum neutralization tests.

It may be of interest to note that another woman, from whose birds the virus of Newcastle disease was recovered, also reported an intense conjunctivitis. This lady did not seek medical assistance but she did contribute a blood sample for examination upon request. The sample was taken approximately twenty-two days after the chicks were found infected. A slight degree of neutralizing activity against the virus of Newcastle disease was found in this specimen.

Previous to hospitalization, the patient had become suspicious of Newcastle disease, or other severe infection, in her flock. Her means of control consisted of killing all the birds on the farm. Unfortunately, only three birds could be obtained for examination and these consisted of specimens from her old group of birds. Specimens from these were submitted to the Animal Diseases Research Institute but the virus of Newcastle disease could not be recovered.

DISCUSSION

The fact that Newcastle disease virus could not be isolated from the three chickens examined does not rule out infection taking place on the farm. There is a possibility that these particular birds were not actively infected, or that they had been infected sufficiently long to overcome the virus. The isolation of the virus from conjunctival washings appears to leave little doubt of the causative agent of the patient's illness.

Mitchell and Walker[5] indicate that the route of entry of the virus dictates the course of symptoms rather than just a predilection for conjunctival mucous membrane. Considering this, the first patient noted may possibly have introduced the virus into the conjunctiva and may also have ingested or inhaled the infective material.

SUMMARY

A case report is given of Newcastle disease of poultry affecting a woman fifty-six years of age, infection occurring by contact with poultry in the field. The symptoms were severe conjuctivitis, headache and malaise. The virus of Newcastle disease was recovered from conjunctival washings but a series of three blood serum examinations revealed no virus or neutralizing antibodies.

We would like to express our thanks to Drs. R. V. L. Walker, C. A. Mitchell of the Animal Diseases Research Institute, and Dominion Science Service for the work of virus isolation and serological examination of this case.

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BICORNUATE UTERUS

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CASES OF PREGNANCY in a bicornuate uterus are still of sufficient interest and rarity to justify being reported.

In order that a clear idea may be had of the abnormalities of the genital tract, brief reference will be made of their embryo-genesis. The Wolffian body and Muller's duct play the most important part in the development, as it is from these structures that the female generative organs are developed. The time at which the arrest in the development of the uterus takes place, determines the degree of abnormality. Thus, if the development is arrested before the 12th week and the ducts of Muller do not fuse together, a duplication of the uterus results. If the fusion of the ducts occurs shortly after that period, a bicornuate uterus is formed and, if the development is arrested or in any way interfered with at a later period, the uterus assumes the undeveloped fetal type occasionally met with in gynæcological practice. Other factors sometimes materially retard development of these organs, such as malposition, nervous conditions, etc. Complete absence is quite rare and not always detected in life.

In 1842, Rokitansky reported what he thought was the first case of pregnancy in the rudimentary horn, but Kussmaul, in 1859, in his classical work, drew attention to 12 cases, the first of which belonged to Dionis in 1681 and which was found at autopsy, when a rudimentary horn with a gestation sac was observed.

As long as normal development occurs there may not be any abnormal features. The horn containing the gestation sac enlarges with the

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pregnancy, while the other horn, if felt, might be considered to be a fibromyoma. Malformation of the vagina such as a septum, may draw closer attention to the uterus. In gravida 2, the uterus will generally be found to be considerably larger than the menstrual history would indicate.

The differential diagnosis is between:

1. Threatened miscarriage—vaginal bleeding due to separation of the decidual cast is likely to cause confusion.

2. Twisted ovarian pedicle—this diagnosis might result when there was torsion of the gravid rudimentary horn or when it was prolapsed into the pouch of Douglas.

3. Spontaneous rupture of a normal pregnant uterus—this is a rare condition, but an occasional case has been reported.

4. Secondary abdominal pregnancy—when a pregnancy in a rudimentary horn goes to term and is followed by a spurious labour, with death of the fetus, it may be retained for a varying period. Previous history of vaginal bleeding due to separation of the decidual cast is likely to be mistaken as evidence of rupture of primary tubal pregnancy and the presence of an abdominal tumour, showing x-ray evidence of lithopedion, is diagnosed as evidence of a secondary abdominal pregnancy.

The patient, age 26, gave the following history. Menses began at 10 years of age, with marked painful flow for 2 weeks. About one year later these periods lengthened to 3 weeks in duration. At 15, periods became more regular, 28 days, and lasted for 8 to 9 days. At 18, she married and 3 months later became pregnant. During the latter part of the 3rd month of pregnancy, she expelled a fetus, but the uterus continued to grow and at the end of the 9th month she gave birth to a normal child, after a thin and apparently bloodless medial septum was removed from the vagina. The pregnancy was carried in the right horn.

About 7 years later, this patient first consulted me about prolonged periods of 10 to 12 days. The above history was reviewed and she was advised to have another child and then consider surgical help. And so, in April of 1950, she was delivered, this time from the left horn, of a normal child. The septum between the two horns could be felt at the time of delivery, at the level of the internal os, and was about 3 to 4 mm. in thickness. The delivery was of short duration, 1½ hours, with outlet forceps. Hæmorrhage, however, was encountered, which required packing of the left horn, and blood transfusion, as the Hgb. had dropped to 62%, Sahli. It appeared to me that the right horn approximated the size of the left horn at the time of delivery. After the first 24 hours, a normal post partum period ensued.

In September, she again consulted me with the complaint of very heavy flow, heaviness in the pelvis, weakness and tiredness. This was evident from the secondary anæmia that was present. Bimanual examination revealed a uterus about the size of a grapefruit, yet no periods had been missed.

On September 14, she was operated upon, at which time a bicornuate uterus was encountered, together with a hydrosalpinx of the right side. A panhystero-salpingectomy, bilateral was performed.

Pathological report.—Specimen consists of a bicornuate uterus and cervix. The septum in the fundus extends as far as the internal os. The cervix contains a cyst filled with mucoid material, measuring 5 cm.

Sections of myometrium shows a mild increase in fibrosis. The endometrium is very thick. The glands are in the secretory stage. Section of cervix is covered with stratified squamous epithelium, in part, and in part with columnar epithelium. There are numerous cervical glands present which appear essentially normal. The surrounding stroma is œdematous and congested. There is no evidence of malignancy.

Diagnosis.—(1) Bicornuate uterus with late secretory endometrium. (2) Chronic endocervicitis.

In summary, this is a report of a case of bicornuate uterus with two successful pregnancies, one in each horn. Metrorrhagia required a hysterectomy, at which time the additional finding of a hydrosalpinx of the right side was made.

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A CASE OF BERIBERI WITH ORGANIC CHANGES IN THE HEART*

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PURE THIAMINE DEFICIENCY in man is rare except under experimental conditions. Although Weiss[1] found the incidence of clinical cardiac manifestations of beriberi to be one in 160 medical admissions in Boston, this figure is much higher than is reported in other centres. At the Toronto General Hospital during the years 1948 and 1949 there were some 7,800 medical admissions. Thiamine deficiency was diagnosed in four cases, all of which recovered. Cardiac involvement was strongly suspected in two of these. A fifth case, the subject of this report, was diagnosed at post-mortem.

Cases of deficiency disease rarely come to autopsy. In 2,049 necropsies at the Banting Institute in the last five years only one case of deficiency heart disease has been recorded. Follis[2] states that confirmed cases of beriberi are rare in the United States. Alleged cases are reported in alcoholics with a dietary insufficiency. Their hearts show myocardial scarring of varying degree and degenerative cellular changes,

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but the diagnosis is arrived at in most cases by exclusion of all other causes. It is now felt that the most satisfactory diagnostic aid is the estimation of the blood pyruvate curve following a carbohydrate meal, before and after thiamine administration.

On November 24, 1949, a 43 year old man was admitted to the Emergency Department of the Toronto General Hospital and died 5 hours later. It was found later that he had been a chronic alcoholic for at least three years.

Eighteen months previously he had complained of numbness in his feet, weakness in his lower limbs, and bouts of ankle swelling, worse at night and absent in the morning. He experienced failing vision, and at times diplopia. One year before death he was admitted to another hospital because he had become much more short of breath and had developed marked dependent œdema. Examination revealed a moderately ill patient, with a puffy face, jugular veins both engorged to the angles of his jaw and pitting of his lower limbs and trunk extending up to the lower costal margins. In both lung bases there was diminished air entry and cracking râles. The heart was enlarged both to the right and to the left. The heart sounds were normal, rhythm was regular at an apical rate of 100 per minute and a soft mitral systolic murmur was heard. His blood pressure was 130/90. Successive readings differed only slightly. The electrocardiographic record showed a P.R. interval of 0.16 sec. and low voltage of QRS and T waves in all leads. This was interpreted as being due to diffuse myocardial damage.

He had no previous history of rheumatic fever or precordial pain. The blood Wassermann was negative. The liver border was felt two fingers breadth below the right costal margin. There was no weakness of the lower limbs and no calf tenderness, but light tough and pin prick were poorly appreciated over both feet, shins and hands, and no tendon reflexes could be obtained. The plantar responses were both flexor. Urinary excretion was normal. There was a trace of albumin on admission. This disappeared with the subsidence of his heart failure. The total serum protein was 5.4 gm. the albumin 3.4 and globulin 1.9 gm. per 100 ml.

He was confined to bed, given a 1 gm. sodium diet, diuretics and digitalis. His œdema gradually subsided, he improved and was discharged home after one month. Beriberi heart disease was suspected, but it was felt the evidence was not conclusive.

During the following year he continued to drink, consuming at least four bottles of wine daily and it was a rare occasion for him to appear sober. Every two or three days he ate a sandwich and for the last three months of life this was all the food he ate. He continually complained of numbness and weakness in his legs. His face was puffy, legs were swollen and he had to rest every four or five steps to get his breath on climbing the stairs to his room.

His final hospitalization was precipitated by his first and only precordial pain. The history of this was vague, but apparently it was of rapid onset, severe and steady. Morphine relieved it temporarily. He was admitted to hospital one hour after its onset. He was cyanotic, pulseless, confused and apparently suffering little pain in his semi-comatose state. His temperature was 92° F. per rectum. His chest was clear and heart rate was regular at 90 per minute. His blood pressure was 55/40. He was given intravenous coramine and aminophylline with no effect. One hour after admission he had two generalized convulsions. He was given 5 grains of sodium amytal and was reported to be sleeping and breathing more easily. The retinal vessels and optic discs were normal. His limbs were flaccid and no tendon reflexes could be obtained. Both plantar responses were flexor. He gradually became deeply comatose and died 5 hours after admission.

Summary of autopsy.—Anatomic diagnosis: Focal necrosis of myocardium, cardiac dilatation and hypertrophy, œdema and congestion of lungs, centri-lobular necrosis and fat vacuolation of liver, central necrosis of mammillary bodies.

At post-mortem the lungs were markedly œdematous. The right lung weighed 1,190 gm., the left lung 830 gm. The heart was enlarged, soft and flabby and weighed 580 gm. Both ventricles were dilated and slightly hypertrophied. The right ventricle measured 0.8., the left 1.8 cm. in thickness. There were many yellowish-grey areas throughout the myocardium of both ventricles, including the septum. These were scattered evenly throughout the entire muscle thickness. They varied in size from 2 to 10 mm. and the larger ones were more plentiful in the anterior portion of the septum. There were also smaller numbers of pinhead-sized grey scarred areas throughout the wall of both ventricles. The endocardium was free of any thrombi and was transparent and glistening. The valves were all thin, pliable, and measurements of circumference were within normal limits. There was only slight atheromatous degeneration in the wall of the first few centimeters of the left coronary artery. The vessels were all patent and there was no stenosis or thrombus formation. The liver weighed 1,580 gm. and was of interest in that the right lobe was yellow and greasy as well as having a nutmeg appearance. Microscopic examination showed a diffuse fatty infiltration and centrilobular necrosis. The brain was uniformly small and weighed 1,198 gm. The basal cerebral arteries were normal. There was slight frontal cortical atrophy and well marked internal hydrocephalus *ex vacuo* of the anterior horns of the lateral ventricles. The mammillary bodies were small and a saggital section through both revealed a central yellowish-brown necrotic area.

Microscopic description.—Microscopically, the yellowish-grey lesions in the heart consisted of a mass of deeply-stained, necrotic muscle fibres, surrounded by a pheripheral zone of absorption (Figs. 1, 2 and 3). Outside this the connective tissues were œdematous and the muscle fibres had undergone varying degrees of hydropic and hyaline degeneration (Fig. 3). Numerous smaller areas were found, invisible to the naked eye, and consisted of œdematous stroma in which all muscle fibres had been absorbed (Fig. 4). An interesting feature of these lesions was the absence of any cellular infiltration about the dead tissue. The grey scarred areas corresponded to diffuse patches of interstitial fibrosis and muscle cell atrophy. These changes were marked throughout both auricles, as well as in the venticular muscle.

The right ventricle was free of any histological changes, except for a few localized areas infiltrated with mononuclear cells. Scharlach R. stains revealed only minimal fatty degeneration. Both mammillary bodies showed the typical changes of Wernicke's disease.[3] The ground substance had largely disappeared, while there were occasional recent hæmorrhages and early gliosis with an infiltration of round cells and cerebral histiocytes. There was no trace of similar lesions in the dorsal portion of the mid brain.

DISCUSSION

Most of our knowledge of vitamin deficiency is based on animal experiments. Experimental thiamine deficiency in animals produces fairly consistent pathological changes in the heart.[2] The animals develop laboured breathing, cyanosis and a number have died suddenly. The heart is dilated and extensive microscopic alterations are seen in the heart as early as the thirty-seventh day of deficiency. Focal and diffuse areas of necrosis are seen throughout the myocardium. These vary from loss of striation,

vacuolation and hyalinization of the fibres up to complete muscle destruction. Scar tissue is seen in animals who have suffered from several episodes of thiamine deficiency. These are probably healed necrotic lesions.

Pathological lesions in the human heart in beriberi have been known and described for over half a century. They are varied and numerous. In 1896 Kürstermann[4] in Germany reported a case of fatal beriberi in a Chinese sailor. He found small foci of fatty degeneration throughout the heart muscle. Glogner[5] noted right and left ventricular dilatation commonly in his cases

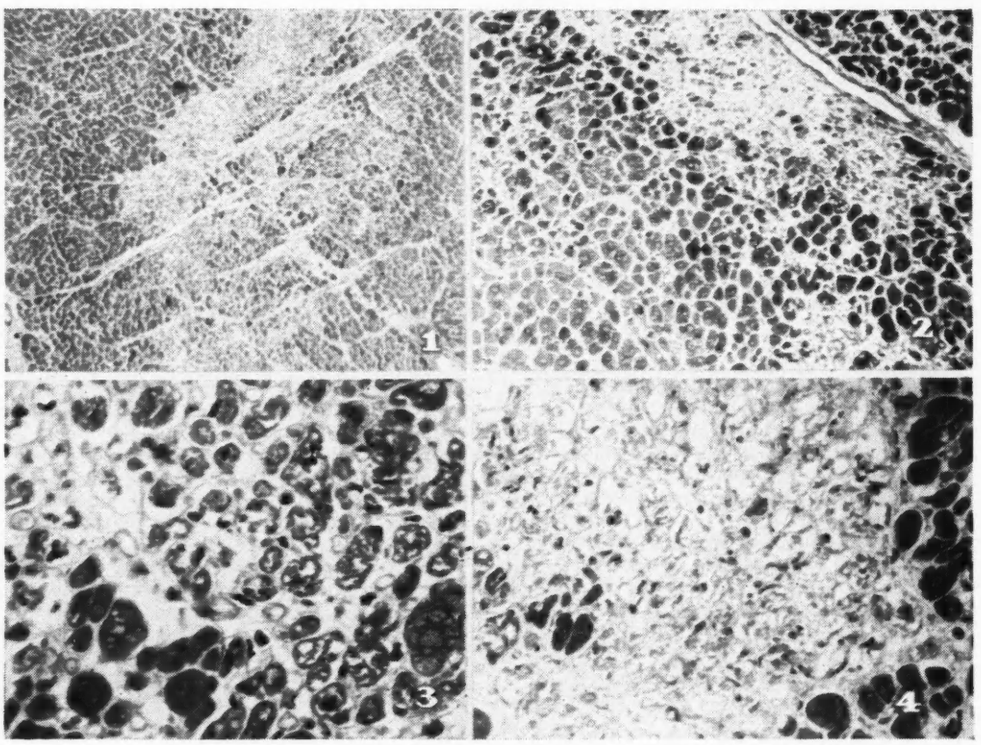

Fig. 1.—A typical area of central necrosis in the left ventricle with a peripheral zone of absorption. X41. Fig. 2.—Interstitial œdema surrounding the zone of absorption. Note the absence of any cellular infiltration. X96. Fig. 3.—Hydropic and hyaline degeneration of muscle fibres. X404. Fig. 4.—Zone of absorption. The muscle cells have disappeared leaving the connective tissue framework and cell debris. X192.

as well as pulmonary œdema and congestion. In the early nineteen hundreds the British literature contained a number of articles on the cardiac changes in beriberi. Hamilton Wright,[6] in 1905, reported that the walls of the right heart had a curious loose structure as though there had been slow but steady dissociation of the individual fibres. He noted varying degrees of fatty degeneration more marked in the right wall and in the papillary muscles. Cloudy swelling, fragmentation of muscle cells, and interstitial œdema were characteristic of more prolonged cases. About this time Dreschfeld,[7] describing heart changes in alcoholics, noted dilatation of the right heart, patchy fibrosis, fatty degeneration and atrophy of muscle cells. It is now felt that alcohol *per se* does not produce these changes,[8] and we think that they were most likely the results of dietary deficiency states. Wenckebach[9] quoted by Weiss and Wilkins[11] felt that the essential change was a muscle degeneration secondary to dilatation of the right heart. He concluded that the hydropic degeneration and interstitial œdema were characteristic if not specific of beriberi heart disease. Weiss and Wilkins[10, 11] reported the first comprehensive study of beriberi heart disease in Occidentals. They and subsequent American investigators[12, 14] have noted hydropic degeneration and insteristitial œdema. Dilatation and hypertrophy were seen in both ventricles and was variable. Weiss concluded that the cardiac changes are not specific and "these nutritional defects do not form a rigid clinical syndrome". Dock[12] noted microscopic thrombi in the wall of the left ventricle, infarcts in the bases of the papillary muscles and myocardial scarring.

From this brief review of the literature it can be seen that there are a few common de-

generative changes, yet the pathology varies considerably from case to case. None of the degenerative changes are specific and I think it would be difficult to differentiate, histologically, a nutritional-deficient heart from many of the other known causes of myocarditis which Saphir[13] describes in his admirable review of the subject.

In our case we have an alcoholic of long standing with a gross dietary insufficiency who was first hospitalized a year before death. At that time he had œdema of his face and upper extremities in the absence of kidney disease. He also had congestive heart failure, cardiac hypertrophy and dilatation of both ventricles and peripheral neuritis. Hypertension and syphilis can be ruled out and in retrospect so can coronary artery disease and rheumatic fever. An infectious myocarditis is improbable. During the three months prior to his death there is concrete evidence of dietary insufficiency and his previous symptoms had returned.

The autopsy demonstrated hypertrophy and dilatation of both ventricles and microscopically revealed hydropic and hyaline degeneration, interstitial œdema and fibrosis but almost no fatty degeneration. It is noteworthy that earlier European pathologists found this latter change constantly yet present day reports describe its occurrence only rarely. The focal areas of necrosis seen so well in this case have been described in the experimental animal. To our knowledge, they have not so far, been described in the human. Thus, this case may be seen to be a link between the findings reported in man and the results of animal experiments. We feel that they are a further step in muscle cell degeneration and evidence of a more severe and acute metabolic disturbance. In contrast, the interstitial fibrosis and cellular atrophy are signs of a more chronic disturbance.

Blankenhorn[15] has laid down 8 criteria necessary for the diagnosis of beriberi heart disease. They are (1) enlarged heart with normal rhythm; (2) dependent œdema; (3) elevated venous pressure; (4) peripheral neuritis or pellagra; (5) non-specific changes in electrocardiogram; (6) no other cause evident; (7) gross deficiency of diet for three months or more; (8) improvement or reduction in heart size after specific treatment or autopsy findings consistent with beriberi. Our case has fulfilled all eight requirements and we therefore feel justified in calling this a case of beriberi heart disease.

The precordial pain which precipitated his final admission to hospital is difficult to explain. Many adults who die suddenly from so-called "coronary thrombosis" have a normal coronary artery circulation, and Raab[16] claims that their hearts contain an abnormally high concentration of epinephrine and related compounds. He regards these as cases of adreno-sympathetic heart disease. He has found that the hearts in thiamine deficient animals contain excessive amounts of epinephrine-like material which disappears as soon as thiamine is supplied. Patients with beriberi heart disease are said to have exaggerated epinephrine sensitivity and the anoxiating effects that this drug has on the heart, even in the presence of a normal coronary artery circulation, may explain their sudden death.

The changes in the central nervous system were those seen in Wernicke's encephalopathy. The relationship between beriberi and Wernicke's disease is still not clarified. Even in experimental animals results are not conclusive. The only conclusion that can be reached at the present time is that it is a disease resulting from a multiple nutritional deficiency rather than a deficiency of thiamine alone.

SUMMARY

A case of deficiency heart disease is reported. The history, physical findings and changes seen at autopsy were characteristic of beriberi heart disease. In addition to degenerative cellular changes in the myocardium and interstitial fibrosis, focal areas of necrosis in the septum and left ventricle were present. Such necrosis has previously been described only in the experimental animal.

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TORULOSIS*

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THIS INFECTION is a true "blastomycosis" in that the fungus appears in tissue as a budding fungus. The protean nature of the disease may cause it to be confused with tuberculous meningitis, epidemic encephalitis, syphilis, tumour or abscess of the brain.

Torulosis histolyticæ (Cryptococcosis neoformans).—About 225 cases have been reported in the literature. Most of these are from the Western and Central European countries, the Southwestern Pacific region, Australia, Japan, Brazil, Argentina and the United States. The disease is very rare in Canada and this is believed to be the first reported case in Western Canada.

The patient, a male of mixed white and Indian race was born in Manitoba in 1916. He was a fisherman and trapper by trade and had service with an armored regiment in the North West European theatre. He had enjoyed good health till 1949 except for a brief period of indigestion in 1944 which was thought to be caused by peptic duodenal ulceration.

In January 1949 he complained of epigastric distress and vomiting. On examination it was found that his spleen was very much enlarged and filled up most of the left abdomen. Hæmoglobin was 70%, WBC were 265,000, and differential count showed myeloblasts 2, myelocytes 23, metamyelocytes 20, "stab" cells 18, neutrophils 35, lymphocytes 1, normoblasts 1. The blood smear was interpreted as being characteristic of chronic myelogenous leukæmia. Bone marrow aspiration showed the appearance of chronic myelogenous leukæmia.

He received urethane and continued with this drug till the final hospital admission. Following treatment with urethane his white blood count was usually in the neighbourhood of 15,000 and abnormal white cells were always present to some degree.

The patient's condition remained static until November 1951 when he complained of a "head cold". This was followed shortly by severe frontal headaches with associated nausea and vomiting. These became progressively more severe and he was admitted to Deer Lodge Hospital on December 12, 1951. On the day of admission the patient complained of weakness of the right leg and foot and of abdominal tenderness.

The fundi showed early papillœdema. The liver and spleen were enlarged, the latter about 4 inches below the left costal margin. There was definite loss of motor power in the right leg and foot and the deep reflexes on this side were accentuated. A lumbar puncture done the next day showed clear fluid with an initial pressure of 340 mm. of water, proteins 16 mgm. %, RBC 50, lymphocytes one.

On December 14 the patient became comatose and developed Cheyne-Stokes breathing. The intercostal muscles appeared to be paralyzed and the left pupil was dilated and fixed to light stimulus. This episode of coma lasted only 35 minutes. The patient then became fully conscious with normal respiration. A lumbar puncture on this date showed an initial pressure of 600 mm. H_2O, proteins 20 mgm. %, RBC 500 and lymphocytes 21. His temperature was 100.2°F.

On December 15 and 16 temperature was elevated to 102°, pulse 110 and respiratory rate 30-35. The patient felt better, headache had disappeared, but he complained of blurring of vision and photophobia. Stiffness of the neck was now persistently present. A definite Babinski was noted on the right. Hyper-reflexia was variable on the right side from day to day. He could not void voluntarily and catheter drainage was required. There was also some weakness of the left arm and leg. No sensory abnormalities of any kind were present. Hgb. was 82%; WBC 9,800, with neutrophils 99%; lymphocytes 1%. Another lumbar puncture on December 17 showed an initial pressure of 170 mm. of water, proteins 20 mgm. %, RBC 500 and lymphocytes 26.

The patient continued to show no change until December 19 when he again became comatose, with respirations 8 per minute. The pupils were widely dilated and did not respond to light. Marked papillœdema was noted. He died a few hours after the onset of coma.

Relevant pathological findings.—Gross: The brain and cord weighed 1,640 gram. The brain was extremely white and lardaceous in appearance.

The right lung weighed 650 grams, the left 500 grams. There were multiple firm, nodular areas from 0.5 to 3 mm. in diameter scattered throughout the lungs. They were yellowish-gray in colour and did not appear to contain pus.

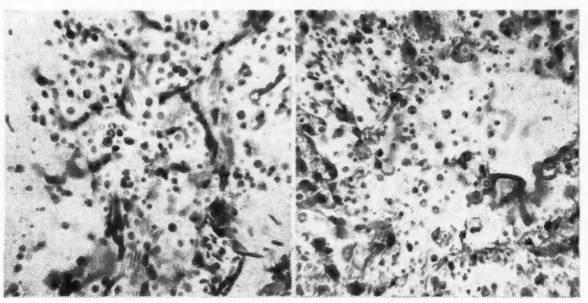

Fig. 1 Fig. 2

Fig. 1.—This is an area in the cerebral cortex with invasion and proliferation of torula histolytica showing a white halo around each organism and minimal inflammatory reaction. **Fig. 2.**—Section of lung showing an area of torula proliferation and fibrosis which was widespread in the lungs. The halo effect around each organism is again evident. Note the varying size of the torula.

The spleen weighed 1,470 grams. The parenchyma was dark red and a few yellowish gray areas were present. The liver weighed 2,200 grams. Similar yellowish-gray areas as those described present in the lung and spleen were dispersed throughout the liver. No enlarged lymph nodes were seen.

Microscopic: Frontal cortex; the leptomeninges showed a marked infiltration of coccoid organisms, microscopically identical with *T. histolytica.* These varied in size from 2 to 9 microns and many showed a doubly refractile contour (Figs. 1 and 2). A few budding forms were seen. Similar changes were seen in the mid-brain, pons, medulla, cerebellum, right internal capsule and spinal cord. The torula organisms were surrounded by a mucoid material like a halo.

Lungs, liver, and spleen showed many small necrotic areas with much hyperæmic and torula infiltration. An abdominal lymph node showed a striking pattern of giant cell proliferation and many foamy reticulo-endothelial cells. No free torula organisms were seen. Nowhere could myelogenous leukæmia be demonstrated. However, adequate bone marrow studies were not done.

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COMMENT

In view of the rarity of this disease in Canada it is considered worth-while to present some of its characteristics briefly.

1. *Source of infection and portal of entry.*—The source of infection is unknown and the disease is not transmitted from man to man. Torula can sometimes be cultured from the skin of humans. The respiratory tract has been considered to be the portal of entry, but a case of skin injury followed by torula meningitis has been reported.[1]

2. *Age and sex incidence.*—Most cases have occurred between the ages of 40 and 60 years. The ratio of males to females is about 2 to 1.

3. *Symptomatology.*—Often the onset of the disease is insidious with intermittently severe frontal headaches, but may be more sudden with headache more pronounced and associated with vomiting, vertigo, stiffness in the neck. Visual disturbances are frequent. Mental symptoms include confusion, drowsiness, restlessness and delirium. Ataxia and hemiplegia have also been noted. The commonest sign has been stiffness of the neck with positive Kernig's and Brudzinski's signs. Fever, if present, is not marked and the leukocyte count is not much elevated. Neuroretinitis and papillœdema are frequent. Occasional periods of remission have been noted but the course of the patient is usually downhill, coma intervening and the patient dying of respiratory failure. If the lungs are involved the clinical picture may suggest tuberculosis.

In the cases reviewed by Levin[2] prior to culture or autopsy, tuberculous meningitis was diagnosed in 10 instances, undesignated meningitis in 5, encephalitis in 7, tumour and abscess of the brain in 10, and psychotic dementia in 5.

4. *Morphological and cultural characteristics.*—The cells of the pathogenic torula measure from 1 to 13 microns in diameter. Budding, their only method of reproduction, is invariably evident. The buds have thinner walls than the mother cell and may be highly refractile. Surrounding the organism in the tissue there is practically always a clear zone of gelatinous material. This constitutes a characteristic feature of the lesion. In artificial cultures the morphological characteristics are practically the same, except no capsules are formed.

5. *Pathology.*—In humans there is a predilection for the central nervous system and the lungs. The skin and skeletal systems have been rarely affected and sometimes the infection is generalized. With the exception of the C.N.S., the torula causes a defensive cellular reaction, similar to that observed in the infectious granulomata. One of the striking features is the large content of mucinous material in the lesions. The structure of the nodules, which vary in size from 0.5 to 8 mm., may be that of miliary tubercles. Caseation and hyalinization may occur.

The reaction in the C.N.S. is less marked. There may be a diffuse granulomatous reaction in the meninges or a perivascular form with small granulomas in the cortex extending from the surface of the cortex along the course of the vessels into the parenchyma. There may be an embolic form with deeply placed lesions in the basal ganglia and the white matter of the cerebrum and cerebellum.[3] The reader is referred to the excellent article by Reeves *et al.*[4] on the symptomatology and pathology of the disease.

Hodgkin's-like reactions in the lymph nodes are not infrequent. Fourteen cases have been described where the ante-mortem diagnosis of chronic myelogenous leukæmia was felt to be firmly established.[5] Our case would seem to fit into this group.

6. *Treatment.*—All forms of treatment including antibiotics have been found ineffective. Urethane appears to be somewhat effective *in vitro*.[6] Antibiotics may even increase the virulence of the organisms.

It would appear to the authors that this infection is one of low virulence and continuing persistence, which probably first attacks the lungs and provokes a fibrosis rather than an exudate. Persisting there it gradually spreads to the other viscera, still with little exudative response, and finally reaches the cerebro-spinal pia arachnoid where it is commonly found in fatal cases. Commonly there appears to be an associated leukemoid reaction.

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Let none presume
To wear an undeserved dignity.
Mer. of Ven. ii, 9.

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MEDIASTINAL EMPHYSEMA FOLLOWING LABOUR

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THE OCCURRENCE of mediastinal emphysema apart from those cases due to trauma, is not common. Faust[1] in 1940 states that after a search through all available literature, he only found 130 cases of subcutaneous emphysema due to labour, the majority in young primipara.

Hamman[2] discussed mediastinal emphysema in 1945 before the American Medical Association in Chicago. He noted four pathways by which air may enter the mediastinum: (1) by way of the fascial planes of the neck; (2) through tracheal, œsophageal or bronchial perforations; (3) from the retroperitoneal space; (4) from the interstitial tissue of the lungs. The latter is the common route, as air rarely enters the mediastinum through the first three.

Through ruptured alveoli and the interstitial tissues of the lungs, air may track along the pulmonary vessels to the mediastinum during surgery of the chest and neck. This is generally the route following chest injuries. Emphysema of the mediastinum may occur from strain against a closed glottis as in heavy lifting, straining at stool and labour. Occlusion of the trachea or a bronchus from any cause may result in rupture of alveoli as in inflammatory disease of the lungs or inhaled foreign body. Mediastinal emphysema may occur spontaneously when at rest or during sleep, probably due to some inherited weakness of the alveoli. This spontaneous mediastinal emphysema is often called Hamman's disease.

Air in the mediastinum may rupture into the pleural cavities, but air in the pleural cavities never enters the mediastinum. Air under pressure in the mediastinum may traverse the fascial planes of the neck and appear subcutaneously in the cheeks, neck and upper chest, or it may follow the aorta and œsophagus into the retroperitoneal space.

Pain in the chest, arms and shoulders without fever or leucocytosis; diminution or obliteration of cardiac dullness; lessened intensity of the heart sounds accompanied by crackling noises synchronous with the heart beat, constitute the usual clinical picture. The appearance of subcutaneous emphysema over the chest, neck and cheeks makes the diagnosis certain.

As air pressure increases in the mediastinum, the large veins tend to collapse and less blood enters the auricles, causing dyspnœa, cyanosis, œdema of the lungs and death. When life is endangered the mediastinum must be deflated surgically through the jugulum.

Mrs. B.H., a primipara aged 20, following a normal pregnancy and labour was delivered of a female baby weighing 7 lb. 10 oz. on June 1, 1950. When seen twelve hours later, she stated that shortly after her labour she noticed swelling in her cheeks, neck and upper chest, which she described as having a "bubbly feeling" to her touch. She complained of pains in these areas which were aggravated by movement.

Examination revealed flushing of the face and a bilateral subcutaneous swelling extending from the temporo-mandibular joints to three inches below the clavicles and into the axillæ. Crepitations were felt throughout this area and considerable tenderness was evident on palpation. Sitting up in bed during the examination embarrassed her breathing and increased the flushing of her face. The cardiac dullness was lessened in area and the heart sounds diminished. While the patient held her breath, crepitations, synchronous with the heart beat were heard over the left edge of the sternum at the level of the base of the heart and immediately below. These were more noticeable five days later when the emphysema was subsiding. The breath sounds were normal posteriorly but anteriorly they were hidden by crepitations. There was no evidence of pneumothorax or fever. The pulse rate was normal and the blood pressure at all times was within normal limits.

A chest film taken 18 hours after labour was reported upon as follows by Dr. G. H. Scarrow. "Surgical emphysema is seen over the upper chest to the level of the second anterior rib on each side, with extension in the fascial planes of the neck and shoulders equally on the two sides. The equal bilateral distribution would strongly indicate that the air is invading the muscle layers from the mediastinum. The rest of the chest findings seem negative and the source of the air entry into the mediastinum is not identified."

By the twelfth day the subcutaneous emphysema had disappeared but the crackling crepitations over the precordium and sternum synchronous with the heart action were still heard, to disappear in a few days.

The past history of this patient seems irrelevant except for the fact that she suffered four attacks of pneumonia from infancy to the age of 14. One sibling was treated in a sanitarium for pulmonary tuberculosis. Several chest plates and chest examinations were negative for tuberculosis in this patient.

The birth of a second child 16 months later caused no repetition of mediastinal emphysema.

The history of this patient suggests the possibility of residual weakness of certain pulmonary alveolar walls as a sequel to the childhood pneumonias. If so, then the chances are that these are the alveoli which ruptured during the second stage of her first labour. In the subsequent healing, it is presumed that these alveoli were either obliterated or so scarred as to withstand the stress of the second labour. It may be that many non-traumatic cases of mediastinal emphysema have a prior pathological alveolar defect rather than an hereditary weakness.

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SPECIAL ARTICLE

THE WAY THE HOSPITAL APPEARS TO THE PATIENT

(An experience with glaucoma. By the patient)

AS A CITIZEN, you always felt proud of this majestic hospital building. You even enjoyed quoting figures on the number of admissions and boasting of the fame of your doctors. The whole picture changes, however, subtly but definitely, when your doctor tells you that you yourself must contribute to those statistics by being admitted as a patient.

You have visited your friends who were patients, and have admired the stately halls and trimly efficient nurses. But when your own D day arrives, you are suddenly critical of the entire place. You are aware of the pervasive odour of anæsthetics and green soap. The elevator, previously so smoothly running, jerks and shakes (or is it your knees that are misbehaving?) That charming head nurse has developed an unpleasantly authoritative ring to her voice as she invites you to get undressed—although it is still daylight—and put on that fantastic flannel nightgown that opens down the back and is far too short. Then you are faced with the problem of scrambling into an unnaturally high bed. When you attempt a little light conversation with the nurse, she retaliates by thrusting a thermometer into your mouth with a firm "Close, please!"

Maybe you have planned for this unpleasant incident in your life, this operation that has been advised. In that case, you have had a chance to pack a bag with necessities and put your personal affairs in order. It is more likely, however, that this is a sudden emergency that has snatched you from a busy personal life, and you are totally unprepared. In either event, this is traumatic, not to be confused with humdrum trips to the office or to social affairs. The hospital is a world in itself, a place set aside from the rest of the city, where life and death come close, and drama is in the very air.

Even your doctor is changed. You have known him as a friend, someone whom you invited to make a fourth at bridge from time to time. As he enters your room in his white coat he is different, a dominant impressive person who holds your destiny in his hands. He gives quick orders regarding the preparation of your body for the operation. Without regard to your delicate feelings, he orders enemas, complete bed rest, medication, maybe the shaving of hair off parts of your body. All this, that is accepted so calmly by the nurse, attains something of the quality of mystic rites to you. The amazing assortment of garments that custom decrees necessary for the operating theatre—the white stockings, turban and sheet—adds a bizarre note that heightens tension so that you are uncertain whether to laugh hysterically or burst into tears.

The realization strikes you like a blow that you, the patient, are being systematically stripped of your individuality, of the dignity built so laboriously over the years in home or business. You have a new status. You are at once the most important and least important person within the hospital. Without you, the patient, the hospital would not exist. For your benefit, doctors, nurses, social workers, laboratory technicians and a dozen more professional groups have studied and toiled for years to attain wider skills. For your benefit, research is carried out and great sums of money are voted by the government to health services. You are the focal point of trained team work. And yet you are nothing. In the hierarchy of the hospital, where the doctor is king, you are expected meekly to obey orders, to submit without complaint to treatments, to cease to use your trained intelligence. Your enquiries into the reason for certain procedures, or the type of medication you are ordered to take, are treated coldly. You, the patient, are expected to have a child-like faith in the infallibility of doctor and nurse. You are expected to regress into childhood and submit to being bathed and sat on the bedpan by complete strangers. And it is made plain to you that the "what" and the "why" are not your business.

Even as your resentment rises, you realize that there is some sense in all this; on admission you tacitly accepted the doctor's authority. His special knowledge must be the deciding factor in what is done to you and for you. You wish, however, that he would recognize the uniqueness of the experience you are undergoing, and that he would treat you as a person of equal intelligence who has the capacity and, indeed, the right to share in the team work being undertaken on your behalf. You cannot ignore the plain fact that something of real importance is being overlooked by him; that emotional scars are in the making, deep wounds that will fester if they are not treated.

Your operation is to be performed on your eye. Your doctor has already explained to you, in layman's terms, what he plans to do, the risks involved and the probable results. You know he is competent and you are not too alarmed over the prospect, largely because he himself is so calm. You realize it will not be a comfortable experience but the end results seem worthwhile.

Being wheeled to the operating theatre is not too bad although you have a few butterflies fluttering around inside. It is a little disturbing when your arms are strapped to the table, but you are able to joke about it with the nurses. The local anæsthetic is a bad moment, quickly over. The operation itself is painless and rather interesting to you since you can follow the conversation between your doctor and his assistants and can gather that everything is progressing well. Finally it is over.

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Then comes a traumatic shock. "Double eye bandage" says the doctor. You gasp out a protest. Only one eye is involved! Are you not to be allowed to *see*? The doctor explains the all too obvious fact—now you think about it—that eyes move in unison and, in order to rest the sick eye, both eyes must be covered. He is very kind about it but quite adamant. You wish he had prepared you in advance. Frantically you wish you had known. You could have had a radio. You could have arranged for friends to visit. You could have. . . . The blindfold plunges you into darkness, wrapping you around, deadening your senses. You are aware that you are being wheeled back to your room, that people are near you, hovering over you, doing deft things to make you more comfortable.

Time passes, how much you do not know. Reality is fading. Suddenly a thousand little devils start stabbing your eye, and you catch your breath in pain. Someone slips a pill on to your tongue. Someone injects a needle into your arm. You drift into sleep.

You wake to more pain. You wonder if "something has gone wrong". Your doctor never warned you about the devils and their knives. You are in a fever of anxiety until you hear his voice, until he assures you that everything is all right and that the pain is due to the stitches pulling as the eye swells and retracts. It is better after that. You can accept the decreasing bouts as a necessary evil, unpleasant but not alarming. You wish he had thought of warning you in advance. You would have been saved some mental torture. His negligence in this area of personal understanding seems to be part and parcel of this whole business of forgetting that you are a person, of relegating you to the patient rôle—the part of the hospital population that is not expected to think.

You are getting better now. The acute stage of postoperative care is over. But the bandage still covers both eyes, and somehow you must live and move and have your being in darkness. It is an abnormal situation that awakens primitive fears. You do not realize, until you are deprived of your sight, how much you depend on it. You know it is only a temporary measure, that it is an embarrassment and not a tragedy, but it is not easy to maintain the light touch in the face of spilled flower vases and other evidences of clumsiness. Your doctor has warned you that you must remain flat on your back and must not turn your head. As you lie there, you seem to float in space. The walls of your room no longer exist. Your ears strain in an effort to replace your eyes. You hear rustles, murmurs, creaks that you cannot identify. You wonder whether you are alone or whether people are walking about near you. The darkness begins to ripple as panic rises. It breaks into waves, explodes into light flashes, stars, strange shapes and faces. You are unable to shut out this weird assortment of "long leggedy beasties" that is tormenting you. Your body is tense, your breath comes fast. For a short time you even forget who you are and where you are.

Fortunately this panic stage does not last forever and you begin to learn to "see" with your fingers. On your bedside table, within easy reach, are paper handkerchiefs, a box of chocolates, a glass of water and other personal things you need. You begin to learn the geography of the table from sense of touch. When the maid comes in to dust, you ask her to replace each object, and you check them before she leaves. You have your radio, too, and you can turn it off and on at will. You are beginning to feel a small amount of independence.

People are constantly coming in and out of the room and you do wish they would tell you who they are. Sometimes you can guess, especially if they speak. You wonder if they "look like their voices"—the ones you cannot place.

Oh, here is the doctor! There is no mistaking *his* firm voice and kindly greeting. He is asking a few personal questions and you settle yourself for a private chat. But what is that? A shuffle of feet off to the right, a rustle of starched uniform to the left. Good gracious, you have an audience! The great man has come in accompanied by a retinue. You wish he had told you. He could so easily have said: "Good morning! I have Dr. X with me today, and Miss Q is here to help with the dressings." You are glad he has taken your hand as he speaks. It is an additional method of communication, compensating to some extent for the facial expression of interest in your welfare that you cannot see.

Here's someone else—two people, talking together softly. They think you cannot hear them, but you can—every word. Now one of them is speaking to you, and *shouting*. You have to smile. Does she imagine you are deaf just because your eyes are covered? It reminds you of your own reactions when talking to someone who does not understand English. You always talk more loudly! You ponder over this business of being temporarily blind. Strange how aware you are of nuances of tone. That nurse who was so tired and impatient when you rang your bell to ask what time it was. But it was important to you to know—she just didn't understand. Then you remember with gratitude the kind night nurse who chuckled when you told her you had had a good night. She explained that it was only 2 a.m. so maybe you could manage another "forty winks" before breakfast. When you could not seem to fall asleep again, she brought you tea and toast—so comforting and relaxing.

The healing process, so important during those days and nights of imposed darkness, is quickened when you have peace of mind, slowed when you are tense, anxious or confused. You find you have mood swings as you lie there in

bed—times when you are sleepily content but others when you are completely frustrated by being forced to remain in bed. You worry over the myriad details of your personal life that need attention. You remember appointments that you forgot to cancel, friends who should be notified of your illness. You long for someone to whom you can talk, to whom you can pour out all your troubles. Then you remember, with relief, that your hospital has a Social Service Department so you ask the nurse for help. Soon the social worker is at your bedside. She has a nice voice and she makes you feel comfortable because she is not hurried. Strangely enough, she seems to understand something of what you are feeling without being told. You ask her if she is alone, or if there are eavesdroppers. She is contrite at not anticipating your needs and assures you that nobody will hear what you are saying. She tells you, too, that what you may say will be confidential, shared only with the doctor should need arise. You feel better after that talk. You know that certain of your needs will be met, and you feel emotionally relaxed at "getting things off your mind". You were even able to tell her how you felt at being a patient. She was interested and sympathetic, and somehow you were both able to joke over your hurt dignity. You feel you have a new friend, one to whom you can talk frankly. You were even able to be critical of her personally, pointing out that you would have appreciated seeing her *before* the operation, when you could have seen what she looked like. You had problems at that time, you tell her, and there was nobody there to help you with them. She agrees, and says she will ask the doctor to let her know in future about the patients on admission. This makes you glow, and you feel you have improved the hospital service to some extent!

When you have had a good day and are feeling relaxed and comfortable, a strange thing happens. You have a sense of sight. All at once you are aware of light shining through the bandages. You know who is around you, and are able to follow their movements round your bed as though you could see them. You chat and laugh, you are at peace with the world, and you can almost sense the healing process going forward at top speed. Soon it will be time for the bandages to come off for good and for your doctor to talk in terms of discharge date. Surprisingly enough, you are not too enthusiastic over the prospect of leaving the hospital. The uniqueness of your experience has gradually diminished. You have become reconciled to your status of "patient" and are almost fearful of reassuming your former responsibilities in the outside world.

At least you have the satisfaction of having a steady topic of conversation for many months to come — "my operation!"

PRESENT STATUS OF ACTH AND CORTISONE*

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IT HAS RECENTLY been stated[1] that approximately 1,600 papers have been published during the past eighteen months on the biochemistry and physiology of adrenal cortical hormones; a further undetermined number have been, and are, continuously appearing in the medical literature dealing with the clinical uses of ACTH and cortisone.

There is hardly a disease or state in which these last two substances have not been tried, and the field has ranged from wasp stings[2] to experimentally produced myocardial infarcts.[3] Nowadays, hardly any doctor may hope to escape a situation in which he will be faced with the question whether these hormones should not be given a trial. Undoubtedly, they have been life-saving in many instances and their use has been followed by dramatic improvement in so many diseases that one would hardly be justified in refusing their trial without some knowledge of their usefulness and limitations.

In diseases which respond favourably, the administration of ACTH or cortisone is followed by a remarkable remission of clinical symptoms within a few days, frequently to some extent in the first six to twelve hours. In febrile patients the temperature drops to normal, appetite returns and there is a general feeling of well-being, all in the continued presence of undiminished numbers of the causative micro-organisms. It has been said that patients with a fulminating bacteræmia feel so well that "they may almost walk to the autopsy table".[4] In other words, the disease process goes on, unabated, while the patient is made considerably more comfortable.

The large amount of clinical data which have accumulated in the short space of time since Hench and Kendall first announced their observations on the effect of these hormones in rheumatoid arthritis,[5] led a number of authors to attempt a presentation in the form of tabulations. Recent experience, however, has demonstrated that mere enumerations of the physiologic effects of ACTH and cortisone can only be taken as indications of general tendencies which are subject to variations in experimental conditions and dosages employed. Similarly, lists of therapeutic "indications", of necessity incomplete, need amplification, for there may be forms of treatment which are preferable to the use of these hormones in a disease which may be listed under "Conditions in which a Favourable Response may be Expected". Greiner, in a recent review,[6] has admirably succeeded in presenting a balanced account of the therapeutic results

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which have been obtained in a number of diseases.

The administration of ACTH or cortisone may be considered as justified in severe states of infection of known origin provided that the causative micro-organisms are at the same time adequately controlled by vigorous chemotherapy. There remains some doubt whether one can uniformly subscribe to this view until further elucidation of the phenomena of suppression of antibody formation and unrestrained multiplication of bacteria in the tissues.[7] It is thought that ACTH and cortisone exert a general "anti-toxic" effect, especially in "overwhelming states of infection".[8] Tuberculosis has been considered a contra-indication to these hormones, but there are some reports of their value as therapeutic adjuncts in some forms of the disease, *e.g.*, in tuberculous meningitis[9] and laryngitis.[10] Combined treatment with the new hydrazine derivatives of isonicotinic acid may offer further possibilities.

When ACTH and cortisone are given, it is advisable to adhere to certain general principles, which experience has shown to be of importance:

1. Patients must be carefully selected. Quiescent disease may flare up and pathologic processes progress in the absence of the usual warning signs.

A decision will be based on careful consideration of the individual case rather than on diseases, while bearing in mind that perforation is apt to occur in peptic ulcers and diverticulitis, and sometimes gastro-intestinal hæmorrhage; insulin dosage must be increased in diabetes mellitus, which may in some cases be difficult to control; retention of sodium and water may accompany renal insufficiency, and is also undesirable in cardiac decompensation and hypertension; the loss of calcium and phosphorus in the urine, together with changes in protein metabolism and reduction of bone matrix, may lead to intensification of osteoporosis, resulting in fractures especially in elderly subjects; psychotic states may be activated in psychopathic personalities. The presence of Cushing's syndrome is an absolute contraindication to ACTH and cortisone, as these hormones may themselves produce manifestations of this condition. Their tendency to cause acne and hirsutism makes it inadvisable to give them to cases showing signs of abnormal masculinization. The healing of surgical wounds is still a subject under investigation, though it is known that large doses of ACTH or cortisone impair healing; when surgical procedures become necessary in patients under treatment, these hormones should not be withdrawn suddenly.

Thrombophlebitis occurs with increased frequency shortly after cessation of therapy. Malaria may be made more severe, and crises may be brought on in sickle-cell anæmia, when ACTH or cortisone are given.[11]

2. As a routine, active steps must be taken to minimize the incidence of complications. Where indicated, the simultaneous administration of appropriate chemotherapeutic agents is imperative. Other helpful complemental measures should not be discarded. Fluid retention may be limited by a sharp reduction of the daily sodium intake. Loss of potassium is balanced by supplemental potassium chloride, two to six gram daily, by mouth, which becomes of special importance with prolonged therapy or when mercurial diuretics are given. The "anti-anabolic" effect of treatment, responsible for the negative nitrogen balance, will be counteracted by an appropriate high protein—high calorie diet, with which the patient's improved appetite has usually no difficulty. Restriction of carbohydrates has been advised. Under prolonged treatment thyroid function is depressed as indicated by decreased serum protein-bound iodine and uptake of radioactive iodine; since the basal metabolic rate tends to be increased by cortisone, this value is not reduced to a comparable degree. The administration of desiccated thyroid in such cases has been found to be of value.[12]

3. Dosage schemes and duration of therapy must be adjusted to the needs of the individual case to give optimal suppression consistent with a minimal incidence of undesirable effects. According to Boland[13] currently used methods aim at suppressive doses at the beginning of treatment, which are then gradually reduced, to cessation of therapy in self-limiting conditions or to maintenance doses in chronic diseases. When prolonged uninterrupted treatment is given, initial dosage should not be too large or continued for too long, reduction of dosage from suppressive to maintenance level should be slow, and should be guided by clinical response and the occurrence of complications rather than by erythrocyte sedimentation rate and other laboratory data. Complete control may not be expected in all cases; some, especially with severe disease, may not tolerate effective doses and it is preferable to be content with results which can be maintained with "safe" dosage levels. During treatment, excessive physical or emotional activity is inadvisable. If therapy is discontinued for any reason, withdrawal of ACTH or cortisone should be slow.

4. As a general principle, ACTH and cortisone should only be used when other therapeutic measures—the lighter artillery—are inadequate. While with their use in a desperate situation dramatic improvement may be hoped for, the very definite hazards associated with the administration of ACTH and cortisone, in particular the masking of unsuspected pathologic processes, must under less pressing circumstances be weighed carefully against the advantages of other possible therapeutic alternatives. The benefits to be derived from these hormones are only symptomatic and temporary.[14]

In summary, it may be said that ACTH and cortisone have a definite place in the armamen-

tarium of every circumspect practitioner. The way in which they produce their clinical effects remains as yet unexplained; the multitude of their actions in the body may be viewed in the light of the common embryonic origin of the tissues, which they affect—the mesenchyme. One may speculate whether the concept of such a common biochemical response of a variety of tissues derived from the same embryonic structure, may not be an illustration of a fundamental principle, worthy of more general therapeutic elucidation in the future.

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CLINICAL AND LABORATORY NOTES

NOTES ON THE DIAGNOSIS OF MALARIA

A. H. NEUFELD, M.D., Ph.D., *Montreal*

IN THE LAST FEW MONTHS some of the Service veterans who have returned from the Far East have developed attacks of malaria. Most of these were primary attacks, no doubt the result of the extensive use of antimalarial suppressive therapy.

It cannot be too strongly stressed that no case should be diagnosed as malarial unless parasites have been found in the blood. Furthermore, it requires a great deal of experience and training for adequate reading of blood smears. Great care must be exercised in order to avoid mistaking blood platelets accidentally superimposed upon red cells for malarial parasites. These platelets are frequently surrounded by an unstained halo. Precipitated stain, dirt or bacteria can constitute other sources of error.

Many of the veterans are being admitted to larger hospitals that have adequate laboratory diagnostic facilities. In others, however, malaria occurs away from such centres and they are treated by local physicians who lack the necessary facilities. Nevertheless, blood films should be examined for parasites in every case of pyrexia in Korean veterans no matter how obvious the cause. For this reason the Director General of Treatment Services, Department of Veterans' Affairs, wishes to advise that the laboratory diagnostic facilities of the larger departmental hospitals, listed below, are at the disposal of all practicing physicians in Canada who wish to submit blood smears for prompt reading.

PREPARATION OF UNSTAINED THIN SMEARS

Blood smears should be taken during the height of fever as well as during defervescence and, if possible, twice the next day. The blood must be prepared in thin, evenly distributed smears on slides or coverglasses. Well prepared films or smears are very essential for accurate results.

Clean the area of skin to be punctured for capillary blood with cotton and alcohol. Dry the area with cotton or gauze, making sure that no alcohol remains on the skin.

Prick the skin sufficiently to permit the blood to well up without exerting too much pressure, but not deeply enough to cause excessive bleeding.

Using a clean slide washed in soap and water, placed in 95% alcohol and dried with lint-free towel, place a small drop of blood on one end of the slide. Holding a second cleaned slide lightly at a 45° angle, touch the drop and allow to spread by capillarity. Pull the drop of blood toward the other end of the slide. Dry the smear in dust-free air without the use of heat.

Slides thus prepared will produce excellent separation of the red blood cells and facilitate examinations for plasmodia. For mailing, if no slide boxes or carriers are available, pack the slide in thin cardboard between two tongue depressors and send to the Director of Laboratory Services of the nearest D.V.A. hospital where there are people trained in Parasitology; namely,

Camp Hill Hospital, Halifax, N.S.
Lancaster Hospital, Saint John, N.B.
Quebec Veterans' Hospital, Quebec City, P.Q.
Queen Mary Veterans' Hospital, Montreal, P.Q.
Sunnybrook Hospital, Toronto, Ont.
Westminster Hospital, London, Ont.
Deer Lodge Hospital, Winnipeg, Man.
Colonel Belcher Hospital, Calgary, Alta.
Shaughnessy Hospital, Vancouver, B.C.
Victoria Veterans' Hospital, Victoria, B.C.

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The Canadian Medical Association Journal

published monthly by

THE CANADIAN MEDICAL ASSOCIATION

Editor: H. E. MACDERMOT, M.D., F.R.C.P.[C.]

Editorial Offices: 3640 UNIVERSITY ST., MONTREAL

(Information regarding contributions and advertising will be found on the second page following the reading material.)

EDITORIAL

MALARIA

As a result of the Korean conflict and in some cases the result of Canadians visiting countries having endemic malarial regions, patients with malaria are being seen in Canada in increasing numbers. Some of these patients are being admitted to hospitals without having first consulted private physicians. Many, however, are consulting private physicians first. Physicians should therefore be familiar with the disease and the most modern therapeutic measures.

Malaria is an infection due to parasites of the genus Plasmodium, which is transmitted to man solely by the female anopheline mosquito. The four species of plasmodium causing malarial fever in man differ in their morphology, but the general course of their life history is similar. The life cycles of the plasmodia consist of three stages: the sexual cycle in the mosquito, the exo-erythrocytic cycle in the liver of man, and the erythrocytic cycle in the blood stream.

Clinically, malaria is characterized by periodic fever with rigors, anæmia, splenomegaly, and the deposition of malarial pigment, hæmatin, mainly in the liver and spleen. There are many diseases, however, which give rise to rigors, such as relapsing fever, brucellosis, urinary tract infections, liver abscess, etc.; even pneumonias can give rigors. In fact there have been suggestions that for an appreciable period after a person has had malaria, almost any fever regardless of its cause will bring on rigors. Therefore we would like to emphasize that a diagnosis of malaria can only be established when the parasites are found in the blood.

There are a number of drugs available which have a powerful action against the erythrocytic cycle of the parasites. These drugs, known as schizonticides, are powerful agents in the control of the acute stage of malaria. They do not seem to have much effect on the exo-erythrocytic forms of the parasites. Suppressive drugs when taken continuously in doses which maintain a schizonticidal concentration in the blood, will suppress the initial development of the erythrocytic parasites from the pre-erythrocytic stages. They will not, however, prevent infection.

This is exactly what has happened in some of our Korean veterans who were on suppressive therapy while in endemic areas. On return to Canada and the discontinuance of suppressive therapy a number came down with primary attacks of malaria. Blood films should therefore be examined for malarial parasites in every case of pyrexia in Korean veterans. For this reason the Director General of Treatment Services, Department of Veterans' Affairs, has offered the laboratory diagnostic services of the larger D.V.A. hospitals to all practising physicians in Canada who wish to submit blood smears for reading by trained people, as outlined in the "Notes on the Diagnosis of Malaria" given in the section Clinical and Laboratory Notes of this issue. We would like to draw attention to several articles on malaria appearing in the September issue of the D.V.A. Treatment Services Bulletin. These adequately cover the latest information on therapy.

One curious feature of the disease is that the period of time from the date of departure from an endemic malarial zone where suppressive therapy is utilized to the onset of symptoms is quite variable, from a matter of days to many months. Another possibility that we should keep in mind is that some of the Korean veterans may have co-existing helminthic infections, as has been reported in U.S. veterans by Kelsey and Derauf and others.

A.H.N.

THIS MONTH'S "SPECIAL ARTICLES"

We have in this issue deviated slightly from our usual course and offer two "Special Articles" instead of the usual one. The first of these is rather unique, presenting as it does the hospitalized patient's point of view. We hope something might be gleaned from this besides the pleasant bit of reading.

The second special article presents in brief form the present status of ACTH and cortisone. The clinical effects of these products no doubt have been the most spectacular recent discoveries in medical research. Their chief value lies in the dramatic power of relieving symptoms of rheumatoid arthritis. However, they also influence the course of many other diseases. They seem to have some as yet unidentified fundamental action on the response of certain tissues to injury.

Editorial Comments

PHYSICAL MEDICINE AND REHABILITATION

The practice of Physical Medicine is both ancient and modern, empirical and specific. At times it has held an honoured place in the medical world—at other times it has been regarded as a cult and a specious science of little account.

The ancients, knowing its merits, applied heat, light, manipulation, massage, hydrotherapy, exercise. Modern physicians apply the same therapeutic measures using devices of recent creation which render simple, measurable and safe, the older practices. Much study and investigation is now being directed toward gaining even greater knowledge of the physiological changes produced by the therapies of physical medicine, and the measurement of these effects is becoming more precise so that greater accuracy in selection and application will result.

Physical Medicine is not engaged in saving life, but in making it more comfortable and more useful. It is therefore inevitable that, as a result of the prolongation of life both in war and peace, there should be a greater number surviving with impaired function than ever before. Hence the demands on physical medicine become greater with each passing year.

As a direct outcome of the concern for rendering life useful, the development of rehabilitation techniques became a part of the practice of physical medicine, and the two practices have now been combined in the one field and are the special function of the physical medicine specialist or physiatrist.

The great and pressing need is now for a number of men and women well trained in internal medicine, to acquire the point of view and the techniques of the physiatrist so that the aim of treating and restoring the disabled to a useful place in society will be taken off the shoulders of the surgeons and physicians already overburdened with diagnostic and definitive treatment problems, and help solve the problem created by an ageing population. (Contributed)

THE GROWING INTEREST IN MEDICAL MYCOLOGY

The need for close study of mycotic disease is fully recognized, even if not widely so. Medical mycology is of course of fairly recent development, originating in the studies of French investigators, and the extent to which pathogenic fungi are involved in human disease has yet to be clearly defined. There is undoubtedly an association between human and animal infections of this nature and the need for co-operative medical and veterinary studies is imperative. It is felt that there are still many unrecognized cases of this type; there are records of several which for long were treated wrongly because their causation was not recognized as due to mycotic infection. A danger also to be realized is that the indiscriminate use of antibiotics in ordinary systemic disease may produce mycotic disease such as moniliasis.

Dermatologists probably see more mycotic infections than do internists, but there seems to be a growing appreciation of studying patients from the mycological point of view, which is all to the good. An important centre for such research in Canada is the Mycology Laboratory of McGill University, under Professor E. G. D. Murray and Dr. F. Blank. An initial private donation has permitted the beginning of this centre for studying human mycotic disease, and of similar diseases in animals. The laboratory is extremely anxious to collect all the material of this sort that it can. It hopes thus to list the prevalent pathogenic fungi of this region. The modes of transmission will also be studied; for example, it is not known for certain to what extent public baths may be responsible in this respect. Another problem is the identification of new forms of fungi which may be brought into the country as a result of international travel.

The whole problem of mycotic disease in the human is being opened up by the research work of this laboratory. Even in its short period of existence it has demonstrated the incidence of unsuspected kinds of infections which were not formerly recognized in this Province. Cases have been proved to be mycotic infections when not previously suspected to be so. Human infections have been traced to animal sources (dog, cat, cattle, and mice) and imports from foreign countries have been recognized.

The laboratory looks for the interest and co-operation of all practitioners in supplying material for investigation. The sending in of specimens or reports of possible cases will be of the greatest possible value.

WHAT IS NORMAL?

During the past two years at least four articles have appeared regarding the difficulty of determining "normal values" of anthropological charts and laboratory tests. With so many references to choose from in text-books, advertisements, and insurance companies, it is becoming self-explanatory why doctors may differ in opinion, each considering himself to be correct and referring to his tables and charts labelled *normal.* Five practitioners examined the same London school children yet their results agreed in only 22% of the boys. Tuxford's Index in Great Britain and Wetzel's Grid in the United States are attempts to show deviations from normal increments, yet they are dependent on

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the charts used in reference by the examining doctor and his clinical judgment—only two of many variables. Many formulæ, A.C.H., Black's, C.R.E. dental index, Pegnet's, Ponderal Index, Pryor's width-height tables, to mention a few, all involve calculations dependent on human variables and hence are not to be relied upon for comparison surveys. Statistics have shown that the average recruit in World War II was approximately 1½ inches taller and 9 pounds heavier than in World War I, yet many recently revised reliable text-books are still appending tables of age, height and weight compiled in 1912, while equally reliable texts quote tables revised and issued within the past five years. Many insurance companies publish such tables with revisions. This flooding of tables adds more and more confusion, as few are in agreement. Further difficulties are encountered in adult weights; formerly one could assume, with fair accuracy, that a man's clothing weighed 10 pounds while his wife's would weigh 7 pounds. Nowadays manufacturers are advertising that nylon skirts weigh 4 to 5 ounces and complete suits weigh 12 to 16 ounces; again one must judge the weight of clothing.

Laboratory procedure results are often indefinite and vague, particularly with blood cholesterol values. These determinations are used in many diseases as diagnostic or an index of progress, yet there is no truly accepted normal value for blood cholesterol or its fractions. With regard to sedimentation rates and glucose values, to cite two, there are so many different methods and "normal" values, that it is necessary to quote the value and the method.

In pre-medical chemistry the blood values of ions and cations are expressed as mgm. or μgm. per 100 ml. of blood or its fractions, now the present trend is to express such values as milli-equivalents or mEq. per 100 ml., or per unit volume. Medicine today is being divided and subdivided into specialties of the specialties. With the increasing multiplicity of analyses, investigations, and tests a new specialty of Interpretation of Diagnostic Tests will have to be created to explain the results and settle the chaos.

J.A.S.D.

At the present time the most commonly employed operative procedure on the sympathetic nervous system is lumbar sympathectomy. It is indicated in deficient circulation of the lower extremity caused by arterial wounds, embolus, thrombosis, Buerger's disease, arteriosclerosis and traumatic causalgia. Occasionally Raynaud's disease may affect the lower extremities to the extent that lumbar sympathectomy is indicated. The benefit following operation is due not only to the interruption of the efferent stream of sympathetic impulses but also, in part, to the interruption of the afferent painful pulses which traverse the lumbar sympathetic chain and accelerate the rate of discharge of vasoconstrictor impulses. —W. J. Gardner, *Cleveland Clin. Quart.*, July, 1952.

MEN AND BOOKS

EARLY MEDICAL EDUCATION IN NORTH AMERICA*

H. E. MACDERMOT, M.D., *Montreal*

MY SUBJECT is obviously much too large for a short paper. I shall refer only to the very beginnings of medical teaching on this continent, and shall be more concerned with the men who taught than with the teaching itself. Indeed, medical teaching as a well defined subject can hardly be said to have existed in America two centuries ago. The economic and social conditions of the country presented in themselves problems of urgency imperative over all less immediate requirements, and those who showed any solicitude for the teaching of medicine were few and widely scattered.

The first actual medical school in North America was established in the University of Mexico in 1578. We have the names of its professors from the end of the 16th to the 19th century. It provided dissection, both human and animal, for the public as well as for the student, just as was done by Vesalius in Padua thirty years before. The course was for four years, and was based almost entirely on the works of Hippocrates.

This school, however, appears to have been an isolated transplant from Europe, and had little influence on medical teaching elsewhere on this continent.

For at least the first century after the settlement of America proper began, medicine as a profession received only the slightest consideration from legislators in the way of protection, encouragement, or recognition. Only occasional attempts were made to regulate practice. In 1639, for example, there was in Virginia an Act to compel physicians and surgeons to "declare on oath the value of their medicines". Later, in the same State, a group of young Edinburgh graduates addressed the House of Burgesses concerning the state of practice:

"Beholding" they said, "with inexpressible concern the present unguarded state of physic in our country, which lies open to the intrusion of every pretender to the medical art", they petitioned that the Burgesses "enact such wholesome laws . . . and prevent anyone for the future from professedly practising medicine who has not received a public testimony of his abilities, by being properly licensed and honoured with a doctor's degree".

As another example, in 1760 the General Assembly of New York ordained that:

"No person whatsoever should practise as physician or surgeon in the city of New York before he shall have been examined by one of His Majesty's counsel, the judges of the Supreme Court, the King's attorney-general, and the mayor of the city of New York".

Training for medicine was universally carried out by the method of apprenticeship, by which, as in Europe, a student was indentured often

*Read before the Section of Historical Medicine, at the Annual Meeting, Banff, June 13, 1952.

beginning in boyhood, to a practitioner for a period of three to seven years. This apprenticeship was largely a kind of servitude, with much drudgery. The student learnt to draw teeth, to cup, bleed, and dress minor wounds; but he might also have to look after his preceptor's horse, and bring it round saddled and ready, as necessary. He learnt his materia medica in detail, as his master's drugs were obtained in crude form, and he had to pulverize bark and roots, make and spread plasters, and make up tinctures, ointments, extracts, blue mass, etc.

However primitive all this may now appear, there was one great merit in the system of apprenticeship. Not infrequently, especially in the early days of settlement, the learned and other professions were united in the same individual: as Toner says, the colonists at first "rather preferred to patronize the medical man who was also minister, farmer, merchant, or mechanic, in addition to being a physician". Consequently, the apprentice had the opportunity of intimate contact with the best minds of the community. How charmingly Oliver Wendell Holmes brings this out in his sketch of Giles Firmin, the Massachusetts clergyman practitioner, riding round the country with his pupil, and talking over the patients they had seen together.

In the development of formal medical teaching instruction in anatomy occupied most attention, as was natural. Credit for the first public lectures in anatomy to a class of medical students in America is given to William Hunter, of Newport, R.I. in 1752. He was a Scot, and a relative of the great Hunter.

But there had been some attempts at teaching anatomy before that. In 1647 the Giles Firmin already mentioned is spoken of as "making an anatomy", and discoursing on it. An "anatomy" was the term for a dissection, and Holmes says that Firmin "may be considered the first ancestor of a long line of skeletons which have been dangling and rattling in our lecture rooms for more than a century". Firmin's lectures were open to the public, and probably were of no great scientific value, but his efforts stimulated the Court to pass an Act reciting the necessity for "such as study physic or chirurgery to have opportunity to anatomize once in four years some malefactor, in case there shall be such as the Court shall allow of".

The casual way in which dissections might be carried out is shown in a note in the diary of a Judge Sewell in 1670, in which he speaks of spending a morning with a group of men dissecting an executed Indian, one of the group insisting on calling the heart the stomach.

A much more notable figure in this teaching than the Hunter mentioned was Dr. Thomas Cadwalader of Philadelphia. He had been one of Cheselden's students, and on returning to Philadelphia in 1730 he carried out dissections and demonstrations for some of his colleagues who had not been to Europe. Amongst these was Dr. Shippen, senior, who was so impressed that it made him decide to send his son to England to complete his medical education.

In 1752 Drs. Middleton and Bard of New York injected and dissected the body of an executed criminal before their students, and in 1771 a number of Harvard students banded together for the secret study of "practical anatomy". This was twelve years before the medical department of Harvard was organized, and the instructor is not known, but is supposed to have been the Joseph Warren who was killed at Bunker Hill.

All these attempts, however, were unsystematic. There were probably others which are not recorded. At that time public feeling was strongly against human dissection. It was seldom done except by stealth and autopsies were not often performed, unless foul play was suspected. Even in Great Britain this opposition to dissection finally disappeared only when the Anatomy Act in 1832 regularized the sources of dissecting material. Until then, the situation contained all that made for the macabre and even criminal. In London the private medical schools set up by men unable to obtain positions on the staff of the large hospitals, established a virtual monopoly of dissecting material by paying the highest prices for bodies to the resurrectionists. These men worked in bands of four or five, their principal source of supply being churchyards and private cemeteries, whose sextons were sometimes in their pay.

The Burke and Hare murders in Edinburgh (1828) were of course the culminating episode which led to the passing of the Anatomy Act. In Massachusetts, however, and perhaps in other States as well, dissection of the human body was technically a felony until 1837. There was more than one instance of doctors being attacked on account of their carrying on dissecting. Shippen's house was thus invaded. He wrote to the papers explaining that the bodies were those of suicides or executed criminals, except, he added, "now and then one from the Potter's Field". In 1785, the revival of Columbia College (originally King's) in New York was attended by violent riots called "the doctors' mob". Rumours that graves had been robbed for dissecting material caused the outbreak. The dissecting rooms of the college were broken into by men who brought out the partially dissected remains and showed them to the enraged crowd outside. The doctors were abused and insulted, and some of the students had to be taken into the jail for protection.

The hostility against dissection then lessened, but it was long before the supply of dissecting material came to be properly controlled, as it was in Great Britain. Reference to grave-robbing and other methods of obtaining bodies can be found in the literature. One of the most detailed ac-

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counts, certainly a very entertaining one, is that by Dr. F. J. Shepherd, of McGill, in his *Reminiscences*. He tells us that there was an Anatomy Act in the Province of Quebec, but no penalties were attached to it, and nothing was done to those who robbed the graves for dissecting material. Finally, one particularly unpleasant incident in Montreal aroused public opinion, and better control was instituted. But this was not until the late 1870's.

The man who stands out as the first physician in America to teach anatomy systematically is William Shippen, Jr., of Philadelphia, already mentioned. After studying medicine with his father who had been so much influenced by Dr. Cadwalader, he was sent to Edinburgh, where he gained his doctorate degree, also studying under the two Hunter brothers in London. He began teaching anatomy as soon as he came back to Philadelphia in 1762, with a class of twelve students. The lectures were illustrated by dissection, and, it was added, "Any gentleman who inclined to see the subject prepared for the lecture and learn the art of dissecting, injecting, etc.", was to pay another five pistoles (about $20). A letter from a wellknown surgeon of the time, Dr. C. F. Weisenthal, advises his son to cultivate a friendship with the young man who helped Shippen to prepare his subjects for dissection, but only, "as far as his morals will permit of (in which particular you know my strict opinion)."

Necessary as anatomical teaching was, however, it was only to be a part of the much more comprehensive plan conceived by another Philadelphian, John Morgan (1735-89), a fellow student in Edinburgh with Shippen. His very first step on returning home was to publish his *Discourse Upon the Institution of Medical Schools in America,* which, according to Garrison, is the first brief for medical education in the country.

In this Discourse Morgan says that he was induced to form a medical college "from a consideration that private schemes of propagating knowledge are unsuitable in their nature, and the cultivation of useful learning can only be effectively promoted under the authority and direction of men incorporated for the improvement of literature."

He goes on to say:

> "A contracted view of Medicine naturally confines a man to a very narrow circle, and limits him to a few partial indications in the cure of diseases. He soon gets through his little stock of knowledge . . . and although he is continually embarrassed, has the vanity to believe that from the few maxims which he has adopted he has within himself all the principles of medical knowledge, and that he has exhausted all the resources of art."

He was far in advance of his fellows in his views on the teaching and practice of medicine. He recognized that the physician could not also be surgeon, apothecary and dentist. What he might think of our present galaxy of specialties I do not know, but he instinctively realized that if a man tried to do everything himself he could do nothing well. On the other hand, he was equally sure that the student of medicine must have a sound education. In this, he attacked the apprentice system, which did not demand such preparation.

There is a pleasant legend of the famous Morgagni claiming kindred with John Morgan, when the latter visited him in Padua. At any rate, the library of the College of Physicians in Philadelphia possesses a splendid copy of Morgagni's *De Sedibus et Causis Morborum* given to Morgan by its author, with the inscription: "Affini suo, medico præclarissimo Joanni Morgan, donat auctor." The relationship between the two is legendary, but not the spontaneous affection and appreciation shown by the older and more celebrated man.

Morgan's place amongst the pre-eminent names in American medicine is secure; not only because of his achievement in the founding of the first American school of medicine (and one of the greatest), but because of his strength of character and fine qualities of mind. And yet he died at the age of 54, in destitution, tragically broken in spirit by political attacks on his good name which he was able only slowly to clear. Shippen too was drawn into the same web of intrigue, and cleared himself similarly, but he seems to have had more resiliency.

Morgan and Shippen won the recognition of such men as John and William Hunter, Watson, Cullen, and John Fothergill. The latter not only wrote to friends in America in their favour, but sent out to Shippen an expensive set of anatomical casts and plates for teaching in the Pennsylvania Hospital, where they are still preserved. The drawings, in coloured crayon, were done by van Rymsdyk, one of the best illustrators of the day; he had done most of the drawings for William Hunter's splendid work on "The Gravid Uterus". The Honourable Thomas Penn also sent out letters recommending Morgan and his plan for a medical school.

With two such men, with such backing, there was no delay in forming the first centre of regular medical teaching in America. The school, as a department of the College of Philadelphia (founded in 1749) was opened in 1765. For two years Morgan and Shippen formed the entire Faculty, their lectures including most of what was thought necessary to qualify students to practise medicine. In 1768 they were joined by Adam Kuhn and Benjamin Rush, perhaps the greatest of all the early American clinicians, the American Sydenham as Lettsom called him. All these men were Edinburgh graduates, but it remained for one not so qualified to complete the course with clinical teaching in the wards of the Pennsylvania Hospital; although it was four years before he was appointed professor of clinical medicine. This was Dr. Thomas Bond (1712-1784) a well known figure in early American medicine. He was a native of Maryland, had studied under a Dr. Hamilton at Annapolis, travelled on the Continent for a while, and

settled in Philadelphia. Large-minded and well informed, he was one of the founders of the College of Philadelphia in 1749.

It was mainly to his benevolent efforts that the Pennsylvania Hospital owed its foundation. But he would have made little headway without the help of Benjamin Franklin, who supplied the all-essential political impetus. Franklin not only helped to interest people in the plan, but persuaded the Assembly to grant £2,000 for the hospital, against opposition, and conditional only on the raising of a like amount by the promoters. Apparently the Assembly would not have granted the money if they had not believed that the citizens would never subscribe the equivalent amount. But Franklin did not tell them that he had assured himself of the subscription before he brought up the proposal. Later on, his comment on the affair was:

"I do not remember any of my political manœuvres, the success of which at the time gave me more pleasure, or wherein, after thinking of it, I more easily excused myself for having made some use of cunning."

Bond did more than found the hospital. As superintendent he brought students into the wards for instruction as soon as it opened in 1756. In 1766 he submitted to the Managers of the hospital a paper on "The Utility of Clinical Lectures", making sure that they took it in by bringing them to his house one evening and reading it to them. The occasion of hospital governors being so instructed is probably unique in hospital history. At any rate the lecture was judged worthy of being inscribed on the hospital minutes. It still makes good reading, and is an excellent sidelight on the teaching of the day.

"When I consider", he begins, "the unskilful hands the practice of physic and surgery has of necessity been committed to in many parts of America, it gives me pleasure to behold so many worthy young men training up in those professions which from the nature of their objects are the most interesting to their community; and yet a greater pleasure in foreseeing that the unparalleled public spirit of the good people of this Province will shortly make Philadelphia the Athens of America. . . ."

Later, after referring to the two professors already appointed, he says:

"The Clinical Professor comes to the aid of speculation and demonstrates the truth of theory by Fact; he meets his pupils at stated times in the Hospital, and when a case presents adapted to his purpose he asks all those questions which lead to a certain knowledge of the disease . . . and if the disease baffles the power of Art and the patient falls a sacrifice to it, he then brings his knowledge to the test and fixes Honour or discredit on his reputation by exposing all the morbid parts to view, and demonstrates by what means it produced death; and if perchance he finds something unsuspected he like a great and good Man, immediately acknowledges the mistake. . . ."

Dr. Bond may not have had an Edinburgh degree, but it could have added little to his commonsense and high standards. He closes his lecture by saying:

"I am now to inform you, Gentlemen, that the Managers and Physicians of the Pennsylvania Hospital have allotted to me the task of giving a course of clinical and Meteorological observations which I cheerfully undertake (though the season of my life points out relaxation and retirement, rather than new Incumbrances) in hopes that remarks on the many curious cases that daily occur amongst one hundred and thirty sick people, collected together at one time, may be very instructive to you."

He was 54 when he wrote this, but was a consumptive, with apparently well advanced disease. However, with care, and bleeding when he saw fit, he lived to the age of 72. The Dr. Weisenthal already quoted has this to say about him in a letter to his son:

"I am glad you have introduced yourself to him, though he may have some oddities, but . . . he is very communicative and takes a delight in instructing young persons."

This establishes conclusively that clinical teaching was in force in the Pennsylvania Hospital as early as 1756. Well might Osler speak of it as "the nursing mother—the pia mater—of the kings (*sic*) of the Clinic in Philadelphia." The War of Independence interrupted the work of the school, however, and it was not until 1789 that it was resumed again.

New York soon followed Philadelphia's lead, and in 1756 a full medical faculty was organized in connection with King's College, afterwards Columbia. The first degree of doctor in medicine in America was granted there (1770).* Pennsylvania granted the first degree of bachelor of medicine, ten in number in 1768. In New England, Harvard organized its medical faculty in 1783. Dartmouth, N.H., followed in 1797.

In résumé, up to the first decade of the 19th century, seven medical colleges had been organized; two in Philadelphia; two in New York; one in Boston; one in Hanover (Dartmouth); and one in Baltimore. The two in Philadelphia soon merged into one, and one of those in New York was discontinued in a few years. So that by 1810 there were five medical schools in the States, with an aggregate number of about 650 students. Only three general hospitals had been established by then; the Pennsylvania, the New York, and the Charity Hospital in New Orleans.

From my brief reference to the Pennsylvania School of Medicine it must not be thought that all other colleges developed with equal readiness. *The Narrative of the Rise and Fall of the Medical College of Ohio* by Daniel Drake introduces us to an instance of the intrigue and self-seeking produced by the exploitation of medical teaching—what he calls "a corrupt and complicated transaction." It is well worth reading, not only for its literary quality but for its being

*As a curiosity it may be recorded that the first to receive a medical degree in North America was Danial Turner, who was given an honorary degree of Doctor of Medicine in 1720 by Yale College. He had given much money to the College, but there was no medical department then (not until 1813) so everyone said that the "M.D" stood for "multum donavit"!

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written by one who overcoming extreme poverty and lack of opportunity became one of the great figures in American Medicine.

The idea of these medical schools was that they should supplement and not supersede the work of the preceptor with his apprentice. All that the colleges did was to allow of the grouping together of several preceptors into a faculty with access to anatomical rooms, a chemical laboratory, and perhaps a hospital. In this way, all the branches of medicine could be reviewed in about five or six months.

This was the plan on which the University of Edinburgh was founded at the beginning of the 18th century, and that university as we have seen served as the model for practically all the early schools in North America.* It certainly was the alma mater of a great many of their first professors. Macphail speaks of "two faint streams from Edinburgh across the Atlantic, one to Philadelphia and one to Montreal."

These colleges conferred the degrees of both bachelor of medicine and of doctor of medicine. The bachelor's degree could be obtained after two to four years of apprenticeship and one year's instruction in college; after which a man could begin practice. But this degree was abandoned by all the colleges after 1813. The degree of doctor of Medicine called for an additional one or two years of study. Davis tells us that "very many served their regular apprenticeship with a preceptor, attended one course of college instruction and began practice without a college degree." Not a few had only the certificate of their preceptor.

There were no standards of preliminary education beyond the necessity for having studied with some regular practitioner; the writing of a thesis; the possession of a good moral character; and the passing of a creditable examination at the end of the second course of lectures. In the University of Pennsylvania the requirements of a knowledge of Greek and Latin and the writing of a thesis in Latin were abandoned in 1792. Natural history and botany were given up soon after.

Naturally, it was long before the colleges began to have any appreciable effect in increasing the number of practitioners with medical degrees. Some statistics by Toner are interesting. He shows that the population in 1776 of what was to be the United States was perhaps not much more than three million. By the time independence was established there were probably not 3,500 physicians all told in the country. Of these, perhaps 350 had medical degrees. Certainly, by 1776 not more than 51 had been granted by American colleges.* The rest of the practitioners were mostly the fruit of the apprentice system. It is impossible to say how many lacked even this training. The number of unlicensed men and charlatans has not been computed. One author compares them to locusts in Egypt. Early medical literature in the States and Canada often refers to them.

There was really no hard and fast line between the qualified and unqualified practitioners until the profession began to develop organization.

Now, this brings us roughly to the beginning of the 19th century, at which stage I shall turn to Canada. Here the developments, if somewhat later in time, were not dissimilar in pattern. Nothing of an organized type of teaching outside of the apprenticeship system existed until 1823, but the population and development of the country was not on a scale comparable with that of the States. It is therefore all the more noteworthy that in 1823 a well organized medical school was opened in Montreal, with a staff of four teachers (all Edinburgh graduates) and with a general hospital in which clinical teaching was carried on.

The teachers were the original staff of the Montreal General Hospital and the school was called the Montreal Medical Institution. Teaching, both by lectures and in the wards was regularly carried out from the very first, but since the school had no affiliation with any teaching institution it could not obtain a charter and was not permitted to confer degrees. To solve this difficulty the staff agreed in 1829 to become the medical faculty of McGill University, itself struggling with a crisis in its organization. It was a fortunate conjunction of events, since it rescued McGill from the danger of losing the endowment which required that the university should be functioning within ten years of the founder's will being probated (he died in 1813 actually) and also gave the medical school a solid foundation.

The quartet who laid the foundation of the McGill Medical School formed a remarkable group. John Stephenson as a student had the distinction of being the first to be operated on by Roux of Paris for cleft palate, and his Edinburgh graduation thesis *De velosynthesi* is still preserved at McGill. Andrew F. Holmes, of great mental vigour, became Dean and his name is perpetuated in the medal established by the Faculty in his memory for the student with the highest aggregate of marks in the course. Wm. Robertson, quiet in manner, apparently wielded much influence by means of his strong personality. He and Wm. Caldwell, the fourth of the group, had both been military surgeons and Caldwell never hesitated to fight for his objects. He was involved in a duel over the founding of the General Hospital and later was in a struggle for the control of his church.

*Packard has a sidelight on the rather casual method of records of the time, showing that some of the matriculation cards and certificates of attendance at Edinburgh University were written on the backs of playing cards, a common enough practice then, due to the scarcity of paper. The card of R. Ashton of Philadelphia, in 1758, for attendance at the Royal Infirmary was on the back of the seven of diamonds; and for the second course of anatomy (not inappropriately!) on the back of the deuce of spades.

*There were some 63 American graduates of Edinburgh between 1758 and 1788 (Packard).

They had in common an intense desire to teach, and set forth their intentions as soon as the hospital opened:

"Having seen" they began, "the great difficulties which the student in medicine in this country has to encounter before he acquires a competent knowledge of his profession; knowing the great inconvenience resulting to many from the necessity at present existing of spending several years in a foreign country to complete a regular medical education and being convinced of the advantage which would result from the establishment of a medical school in this country . . . (we) have met to consider the possibility of founding such an institution in this city. . . ."

It has been said that teaching in hospital wards on this side of the Atlantic was first carried out in the Montreal General Hospital. That is obviously not so, in view of what we know of the Pennsylvania Hospital. But it is probable that no other hospital has so steadily continuous a history of definite teaching at the bedside, since the first American schools suffered interruptions in their early days and not until Osler came to Philadelphia was clinical teaching again restored in the true Edinburgh tradition. The Toronto General Hospital was begun in 1820, but it was not even used as a hospital until 1829, and for long after that there was so little development of its opportunities for clinical teaching that Osler turned to Montreal for this part of his training. The first medical school in Upper Canada was the medical department of King's College in Toronto, which was founded in 1842. It was deprived of its charter in 1850 and superseded by the University of Toronto.

Now, this fragmentary sketch has emphasized the elements common to the development of medical education in both our countries—the determination of individual medical men to improve standards, and the consequent opening here and there of schools, private at first, and then usually becoming part of universities.

However, with the gathering impetus of rapid expansion a situation developed in the States which fortunately was almost wholly absent in Canada. This was the rapid increase in the number of colleges without a corresponding maintenance of the teaching standards of the men who founded the first schools and with a gradual lessening of control over licensing. I have referred to the fact that the school from which McGill grew was at first hampered by its inability to obtain a charter for lack of university affiliation. This may have seemed an irksome restriction at the time, but it was the very absence of such control over private schools in the States which contributed so much to the growth of unsuitable medical schools in that country. It was not until the appearance in 1910 of the famous Flexner report on medical education in the U.S. and Canada that the reforms were started which gradually eliminated these undesirable schools.

Flexner has pointed out that "In Canada conditions have never been so badly demoralized as in the U.S. There the best features of English clinical teaching had never been wholly forgotten."

But conditions were not comparable in the two countries. Economic pressure and a rapidly increasing population similar to that of the States might well have produced in Canada numbers of schools in competition with each other, with all the evils of insufficient staff and equipment and poor teaching. We too under such conditions might have lost for a while the guiding light of clinical teaching so instinctively followed and so finely perpetuated by the genius of William Osler.

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MEDICAL SOCIETIES

CANADIAN RHEUMATISM ASSOCIATION

The Canadian Rheumatism Association held its Annual Business and Scientific Meetings on June 9 and 10, 1952, in the Banff Springs Hotel, Banff, Alberta. Well attended and very interesting scientific meetings were held in the afternoon of June 9 and morning and afternoon of June 10.

At the Annual Business Meeting, the following executive was elected for the 1952-1953 term.

Past President—Dr. Arthur W. Bagnall, 832 Medical-Dental Building, Vancouver, B.C. President—Dr. Wallace Graham, Medical Arts Building, Toronto. 1st Vice President—Dr. L. G. Johnson, The University Clinic, Royal Victoria Hospital, Montreal, P.Q. 2nd Vice President—Dr. Donald C. Graham, Suite 5, 410 Bloor St. E., Toronto. Secretary Treasurer—Dr. T. E. Hunt, Saskatchewan Division, Canadian Arthritis and Rheumatism Society, Box 277, Regina, Saskatchewan.

Delegates to Council are: Dr. W. S. Barnhart, Ottawa; Dr. S. Dworkin, Montreal; Dr. H. G. Kelly, Kingston; Dr. M. A. Ogryzlo, Toronto.

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MISCELLANY

REGISTRATION IN THE UNITED KINGDOM

Canadian doctors proposing to register in Great Britain with the General Medical Council will find in the following memorandum prepared by Dr. H. A. Sandiford, Medical Director of the Empire Medical Advisory Bureau, much useful information. Applicants for registration with the G.M.C. will be required after January 1, 1953, to produce evidence of having served an internship of at least one year in addition to certificates of qualification and registration with a provincial licensing authority which reciprocates with the G.M.C. Canadian Doctors proceeding to the United Kingdom would be well advised to provide themselves with a certificate from the Administrator of the Canadian hospital in which the rotating internship was served.

NOTES ON PROVISIONAL AND FULL MEDICAL REGISTRATION

Definitions.—A "house officer", *for the purpose of registration,* is a person who after passing a qualifying examination has been engaged in employment in a resident medical capacity in one or more approved hospitals.

Employment in a "resident medical capacity" means employment in the practice of Medicine, Surgery, or Midwifery, where the person in question is resident in the hospital or institution where he is employed or conveniently near thereto, and is by the terms of his employment required to be so resident.

"Medicine" and "Surgery" include branches of, and specialties in, both these subjects.

GENERAL INFORMATION

1. Under the Medical Act, 1950, and regulations made thereunder by the General Medical Council, a newly medically qualified person *of the United Kingdom* cannot obtain "full registration" on or after January 1, 1953, until he or she produces proof of further experience after passing the qualifying examination.

Proof requires the production of a certificate showing that the applicant for full registration has given satisfactory service as a house officer in recognized "pre-registration" posts in approved hospitals or institutions for a period of 12 months. The applicant shall have been a house officer in medicine for 6 months and in surgery for 6 months. The applicant may count time as a house officer engaged in midwifery up to 6 months as time spent in medicine or surgery as he may elect. Time spent in employment in a health centre may under certain conditions count towards the 12 months requirement.

The pre-registration hospital appointments must be approved by a "Licensing Body", that is, any University or other body in the British Isles empowered to grant a qualifying diploma.

A list of recognized pre-registration house officer appointments in approved hospitals of the British Isles will be published periodically by the General Medical Council. It is legally open to Licensing Bodies in the United Kingdom to approve hospitals or institutions in a Commonwealth or foreign country for the purpose of the requirements noted above and the General Medical Council list will in due course include such approved hospitals.

It is intended ultimately that recognized house officer appointments in the British Isles should be available at times of the year convenient to the requirements of applicants, newly qualified in the United Kingdom.

2. *Overseas applicants for full registration who hold recognized diplomas granted in Commonwealth or foreign countries which have reciprocity with this country.*

On or after January 1, 1953, such applicant for full registration must satisfy the General Medical Council: (a) that he has fulfilled the requirements noted in paragraph 1 above for persons qualified in the United Kingdom; or (b) that he has rendered satisfactory service in appointment(s) conferring experience of the practice of medicine and surgery, or medicine, surgery and midwifery, not less extensive than that noted in paragraph 1 above as required for persons qualified in the United Kingdom; or (c) that he has otherwise acquired experience "not less extensive than that required for persons qualified in the United Kingdom".

The General Medical Council is the sole authority for determining whether an overseas applicant for full registration has complied with the necessary requirements.

3. An overseas applicant (as defined in paragraph 2) who is newly qualified and who wishes to obtain in due course *full registration* in the United Kingdom may apply for employment as a house officer in a recognized post in an approved hospital in the United Kingdom. After being selected for a pre-registration post he may then apply to the Registrar of the General Medical Council for *provisional* registration, supporting his application with a certificate from the hospital authority which appointed him. A fee of 5 guineas is payable for provisional registration.

At the end of a pre-registration appointment the practitioner must obtain a certificate from the hospital authority showing the duration of the period for which he was employed and stating whether his service was satisfactory. The form of this certificate is not yet available.

After fulfilling the requirements noted in paragraph 1 above the provisionally registered practitioner may apply for full registration to the Registrar, General Medical Council. The additional fee for full registration in such case will be 6 guineas.

4. An overseas applicant (as defined in paragraph 2), who produces evidence satisfactory to the Registrar of the General Medical Council that, by virtue of intern (house officer) service for not less than 12 months, he has obtained full registration in the territory where his diploma was granted, may apply for full registration in the United Kingdom, *provided the territory where he obtained his diploma has adopted, and the applicant's service was rendered under, a compulsory scheme of intern (house officer) service substantially equivalent to the scheme outlined in Paragraph 1 above.*

Full registration, the fee for which is 11 guineas, will likely be granted without delay in such cases.

5. An overseas applicant (as defined in paragraph 2) who has acquired experience for not less than 12 months as a house officer, but has not acquired that experience under a compulsory internship scheme (vide paragraph 4), may apply to the Registrar of the General Medical Council for *full* registration. The applicant may have qualified in a territory where no internship scheme substantially equivalent to the United Kingdom scheme has been introduced or in a territory where such scheme was introduced after his qualification. The General Medical Council will take into consideration evidence of satisfactory service for not less than 12 months in employment in a resident medical capacity in any hospital or institution which the Medical Council or other appropriate medical authority of the territory in which the applicant qualified may consider satisfactory for the purpose of acquiring the experience indicated in paragraph 1 above.

The fee for full registration is 11 guineas.

6. Other overseas applicants (as defined in paragraph 2), not falling within the classes of applicants included in paragraphs 3, 4 and 5 above, who may have acquired clinical experience after qualification in other ways, may apply for *full* registration to the Registrar of the General Medical Council. Applicants may have had experience in non-recognized clinical appointments in hospitals or as Medical Officers in the Armed Forces or in general practice; or they may have had a combination of experience in two or more such capacities. Applicants should give full information as to the evidence of experience on which they rely *well in advance of the date by which a decision is required.*

The fee for full registration is 11 guineas.

The above notes are based, at the date noted below, on the provisions of the Medical Act, 1950, and of the regulations and memoranda of the General Medical Council and of the Ministry of Health. They are intended as a guide to responsibility for omissions or errors in the notes.

The first edition of the list of recognized posts in approved hospitals to be published by the General Medical Council (see paragraph 1) is expected to be ready in the autumn of 1952, at a cost of approximately five shillings, excluding postage. Application for copies should be made to the Registrar, General Medical Council, 44 Hallam Street, London, W. 1.

The General Medical Council is the sole authority for determining whether an overseas applicant for full registration has complied with the necessary requirements. Applications for registration made to the General Medical Council before January 1, 1953, are governed by the existing regulations.

Empire Medical Advisory Bureau,
B.M.A. House,
Tavistock Square,
London, W.C. 1.

H. A. Sandiford,
Medical Director,
July 24, 1952.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

Prescription Levy

On June 1 this year the new regulations came into force whereby a patient had to make a contribution towards the cost of medicines and dressings prepared under the National Health Service. The "levy" as it has come to be known consists of 1*s.* on each prescription form, irrespective of the number of prescriptions on the form. The Ministry of Health has now published a comparison of the number of prescriptions submitted in June this year and in June 1951. This analysis shows that, in England and Wales, the number of prescriptions submitted in June 1952 was 14,416,800, which represents a decrease of 15.57% compared with June 1951. The number of prescriptions forms in June this year was 8,545,000, representing a decrease of 20.4% compared with June, 1951. The number of prescriptions per form averaged 1.69 in June this year, compared with 1.57 in June, 1951.

It is impossible to assess the significance of these figures, but they do suggest that the levy is subserving a useful function in restraining the popular demand for prescriptions which swept over the country on the introduction of the National Health Service. The small increase in the number of prescriptions per form was not unexpected in view of the fact that the levy was on the form, irrespective of how many prescriptions it contained, and not on the prescription. It is interesting to note that in certain circles the view is now being put forward that a small levy per consultation might also help to ensure a more discriminating use of the Service by the more hypochondriacal section of the community.

Poliomyelitis and Enteric

The figures for poliomyelitis show a higher incidence this year than last year, but still below the figures for 1950 and 1947. The latest figures available are those for the week ended August 16 (the 33rd week of the year): a total of 258 cases consisting of 170 paralytic cases and 88 non-paralytic cases. The total for the previous four weeks was 250, 230, 253, 163. Including the figures for the week ended August 16, the over-all uncorrected notification rate for England and Wales was 5.00 per 100,000. Regional analysis shows the highest incidence in the northern region (10.76 per 100,000), but in the neighbouring north-western region the incidence is only 2.7. In London and the south-east the incidence is 5.23 per 100,000.

An interesting feature of the epidemiological tables this year is the high incidence of the enteric fevers, especially paratyphoid fever. During the week ended August 2, 130 cases of paratyphoid and 5 cases of typhoid fever were notified in England and Wales—the highest figures recorded for any week during the last nine years. Wales was responsible for the bulk of the cases, an dduring the preceding twelve weeks 327 cases had been notified in the Principality. The peak of the epidemic has already been reached, and the figures for the following two weeks are falling: 62 cases of paratyphoid and 4 of typhoid, and 40 cases of paratyphoid and 4 of typhoid respectively.

Help for Tuberculous Students

This country has never been very forthcoming in providing facilities for tuberculous students to resume their studies. The problem is not an inconsiderable one; Sir Alan Rook, the Senior Health Officer of the Cambridge University Health Service, has estimated that there are about 500 British students in sanatoria and that there are another 2,000 under treatment or observation. Active measures are now being taken to remedy this defect in our health services, and earlier this year the British Student Tuberculosis Foundation was set up, with the immediate aim of establishing a 100-bedded rehabilitation centre where students convalescing from tuberculosis can be fitted to return to college by courses of study.

It is now announced that this month a small experimental unit for male students is to be opened in a sanatorium in Berkshire. This centre will have accommodation for 16 students in one self-contained ward divided into three parts: a dining room, a lounge, and a bedward where students can read in silence during rest periods. Admission is open to "full-time male students from all parts of the British Isles, of any race, colour or creed". Admission will be restricted to those who are recovering satisfactorily: *i.e.*, are non-infectious in the sense of sputum negative, are fit to do light duties such as making their own beds, are able to take all meals up and can stay up and dress for at least four hours a day. The Foundation is responsible for occupational treatment and is making arrangements for University teachers, principally from the University of London, to visit the Centre regularly to give lectures and to supervise individual courses of study.

Blood Donors

The difficulty in providing supplies to meet the modern craze for blood transfusion is well exemplified in some figures given by the Minister of Health when he opened a new blood transfusion centre which has just been erected in London at a cost of £45,000. Blood donations in England and Wales are now being given at a rate of 600,000 a year, which is almost as high as the all-time record of 1944 (of D-day fame) when there were 669,000 gifts of blood. After the war there was an inevitable slump, and by 1946 the number of donors had fallen to 270,000, compared with over a million in 1944. The present figure is 470,000. An interesting feature of the position today, according to the Minister, is the high proportion of middle-aged people among the donors. There is a growing consensus among more responsible physicians and surgeons in this country that transfusions, of both blood and plasma substitutes, are being used on an increasingly indiscriminate scale. A little more thought and a little less transfusion would probably be to the benefit of many patients. William A. R. Thomson

London, September, 1952.

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OBITUARIES

DR. A. W. BEATTIE, aged 74, general practitioner in Belmont, Ont. for the past 44 years, died on August 14 in Victoria Hospital, London, after a week's illness. He graduated from the University of Western Ontario Medical School in 1905 and interned at Toronto General Hospital for two years. He started practice in Belmont in 1908.

Dr. Beattie was born in Pond Mills, and was a past president of the Middlesex Medical Association, a past master of Belmont Masonic Lodge No. 190, a member of St. George's Royal Arch Masons Chapter, London, and Belmont Presbyterian Church. Surviving is his widow.

DR. KATHLEEN BOSCI, aged 30, died in Sudbury, Ont. on August 2. Born in Hungary, she fled from her home during the war and was captured by the Germans. After being in several concentration camps she escaped to France and then went to England where she was able to continue her research work in the Rhesus factor. Through the efforts of the Children's Hospital of Winnipeg she came to be an assistant to Dr. Bruce Chown in 1949 and worked in the case room of the Rhesus laboratories.

DR. WILLIAM BUTTLE, who had practised in Pakenham, Ont. for the past 34 years, died on August 7 in Arnprior and District Memorial Hospital in his 65th year. He had suffered a stroke while holidaying at Golden Lake —his second since last October. Dr. Buttle had been in partial retirement.

A son of the late Thomas Buttle and his wife, Susannah Leach, he was born in Bromley Township, near Cobden, and attended local schools and Pembroke High School. After leaving High School he taught school for a few years and then entered the University of Toronto. After graduating in medicine from the University of Toronto, Dr. Buttle started practice at Kinburn. In 1915 he went overseas with the R.C.A.M.C.

For many years he was president of Pakenham Curling Club. His hobby was astronomy, Surviving are his widow, two daughters and one son.

DR. CHARLES S. DUNNING, aged 60, coroner in North York for 23 years, suffocated on August 13, in the smoke filled bedroom of his home in Toronto.

Graduate of Queen's University, Dr. Dunning had been practicing in North York for 25 years. He was York Children's Aid Society consulting physician and medical examiner for the Imperial Life Insurance Co. and de-Havilland Aircraft Co. Surviving are his widow and one son.

DR. CHARLES ARTHUR HENRY LAWFORD, aged 89, of Edmonton, Alta., died on August 10. Dr. Lawford was coroner and magistrate at Smoky Lake from 1900 to 1944 and was instrumental in building the George McDougall Hospital and the Methodist Church at Pakan.

Born in Lymdhurst, Eng., Dr. Lawford came to Canada at an early age, settling at Toronto. He moved to Winnipeg in 1879 and took his medical and theological training there. He was ordained as a minister of the Methodist Church in 1892. In 1900, Dr. Lawford moved to Pakan and in 1906 built the George McDougall Hospital and the Methodist Church. All equipment for the construction of the buildings was brought down the North Saskatchewan River from Edmonton by him.

He was superintendent of the hospital until 1920 when the C.N.R. reached Smoky Lake. The hospital was then transported from Pakan to Smoky Lake and Dr. Lawford set up private practice in that village. He remained in Smoky Lake until his retirement in 1944, when he moved to Edmonton. He was a member of the Smoky Lake Chamber of Commerce and was active in Red Cross work. Survivors include his widow and five daughters.

DR. EUGENE LEMIEUX died on August 13 in Ste. Anne's Veteran's Hospital near Montreal. He leaves saddened a wide circle of friends in Ottawa and Hull.

A veteran of the Boer War, Dr. Lemieux died after an illness of some three months. He was 82 years old, and until his retirement had been with the Federal Department of Health. Surviving are three brothers, Dr. L. J. Lemieux, Hon. Gustave Lemieux, legislative counsellor at Quebec; and August Lemieux, Q.C., a prominent Ottawa barrister, and one sister, Mrs. J. C. Pouliot, widow of the former Supreme Court Justice.

DR. ROY DICKSON LINDSAY, Pensions Medical Examiner at Camp Hill Hospital, Halifax, died on July 26 at the age of 62 years. Dr. Lindsay was born at Caribou. After graduation from Dalhousie Medical School in 1917, he joined the Canadian Army and served as a captain with the R.C.A.M.C. Following the war he set up practice in New Germany. He then moved to St. Catharines, Ontario, where he practised until 1940.

He served with the rank of Lieutenant-Colonel in the R.C.A.M.C. in World War II and in 1944 he joined the staff of Camp Hill Hospital as Pensions Medical Examiner. He is survived by his widow, a son, Dr. Donald Lindsay, on the staff of the Nova Scotia Hospital, and a daughter.

DR. EDWARD REECE, aged 60, a graduate of Queen's University, Kingston, died on August 14 at Windsor, Ont.

Dr. Reece returned to his home in Georgetown, British Guiana after his graduation from Queen's in 1920, and became resident surgeon in New Amsterdam and Suddic hospitals. He returned to Canada in 1942 and served as Medical Officer of Health on Pelee Island, Ont. until 1950 when he went to England to take a postgraduate course. On his return to this area a year later he set up practice in Windsor. Survivors are his widow, and a daughter.

DR. WILLIAM BURROWS SPROULE, age 72, died at his home in Thessalon, Ont., on July 25. He graduated from the University of Toronto in 1906. In 1914 he set up practice in Thessalon to continue until retirement in 1950. He served as coroner for the town and district for 35 years and in 1925 became M.O.H. and held office till his retirement in 1950. In October 1951, at Varsity homecoming week-end, he was pleased to attend the 45th class re-union.

Dr. Sproule is survived by his widow and two sons.

DR. GRAHAM WILSON, aged 62, died on August 15. Graduating from Manitoba Medical College in 1916 he served overseas in the Canadian Army Medical Corps in the first world war. On his return in 1919 he engaged in general practice in Winnipeg. He was a member of the Winnipeg Winter Club from its formation. He is survived by his widow, two daughters and two grandchildren.

AN APPRECIATION

Dr. Mary Whittaker died after a long illness on July 15, 1952, in Toronto and something has gone out of the world.

My first sight of her was in 1919 when Kings College was flooded with Ex-Service men and women. I remember "letting off steam" to her one day over the Americans' win at Chateau Thierry—and she listened in silence. I found out later that she and Mary Booth had carried

out work for the Salvation Army living in a broken down farmhouse in or near the firing line for 4½ years. She had a marvellous memory. She never took notes at lectures, but remembered all. Years later we would argue over some point (anatomical or surgical) and she would say "Yes, but don't you remember at Out-Patients, Mr. S.-and-so would say "....."', and I had forgotten.

She secured the Primary F.R.C.S. and after qualifying in 1924 she disappeared to Winnipeg, somewhat to the disappointment of Charing Cross Hospital. We, in London, were a bit bewildered—where was Winnipeg? Several of us found out; she was running the Grace Hospital for the Salvation Army. It was a General Hospital and the third largest in the City. She remained there for eight years and during that time three or four of us went to work with her at different times. The work was varied and always interesting, and included the usual large proportion of midwifery catered for by all Canadian Hospitals.

One surgical case sticks in my mind—a child of nine or ten years of age with a burst appendix was rushed in from a village on the edge of Lake Winnipeg. This had happened some days before—there were no facilities on the spot to operate and the place was ice-bound, but the ice broke a few days later and her local Doctor put her on a motor launch and steered through blocks of ice to the next town where the first train of the summer was starting up for Winnipeg. We got her into the Operating Theatre, Dr. Whittaker gave anæsthetic and I assisted. I regret I cannot remember now who operated. The child's own doctor was too tired. Anyway, in opening the abdomen a fountain of pus rose 12 inches into the air, and all was well. No sulfonamides, no penicillin, no chloromycetin, and she made an uninterrupted recovery.

I cannot recall anything *but* recoveries in that Hospital, and think the quiet atmosphere of Winnipeg *and* the Canadian sunshine helped a great deal.

I must remark on the interesting people who called or stayed at the Grace—a constant stream. In 1930 the B.M.A. had its Annual Meeting in Winnipeg and several of the visitors from England stayed with us. At other times the Hospital seemed a port of call for many passing across Canada who were old friends of Dr. Whittaker or were connected with the Salvation Army. The Archbishop of Ruperts Land dined with us one evening and told us of his attack of pneumonia when in the Arctic years ago and alone in an Eskimo igloo. He was refused water to drink by the Eskimaux through ignorance, and he only saved his life by turning on his side and licking at the ice blocks forming the wall of the hut.

Another intrepid man was Major Burwash who had spent 20 years of his life doing Government work in the North and along the Coast-line from Back River to the mouth of the Mackenzie River. He was lecturing in Winnipeg on the Franklin Expedition and came one evening and brought some Franklin relics,—pieces of rope, copper nails, and an old note-book written by Lady Franklin.

After 1932 Dr. Whittaker practised in Toronto till this last illness, and many are the long interesting letters we have exchanged describing our cases. She also was Divisional Surgeon for St. John Ambulance Brigade during the War. Toronto friends may describe her work there more fully than I can do. She has sent parcel after parcel to friends in England during the War, and personally I have asked her to stop for the sake of her pocket. The postage alone must have cost a small fortune, but a parcel with tea and coffee came only the other day.

Her chief hobby was animals—a Pekinese dog in Winnipeg, one or two dogs and prize cats in Toronto. She was quiet and silent and a wonderful listener to other peoples' woes.

As Mary Booth says, "Whittaker has done so much to alleviate the suffering of others". She was awarded the M.B.E. for her work in the 1914-18 War.

FRANCES E. SMITH

AN APPRECIATION

DR. WILLIAM F. MacKINNON died at his home, Antigonish, on May 26. Antigonish was his home town in a very real and intimate sense. In the early, and leaner days of his professional life, when more lucrative prospects of practice beckoned him elsewhere, he brushed them aside, preferring to develop and practise his life's work among the people he knew and loved, and who loved him in return. A strong character, of sound and discerning mind, one that hated sham and insincerity, he was well equipped for mapping out any worthy course he desired to follow. And so he settled in his home town and county, his passing coming a month after he had completed fifty years in the profession.

Fifty years back, the horse and buggy, bad roads, no nearby hospital, few or no trained nurses, largely rural practice in scattered country-side—such was the picture the average young doctor, fresh from the schools, faced in those days. Depressing perhaps to some; to others an inspiration, rich in the abundance of opportunity for worthy service; presenting the new practitioner with a field where his years of study and the guidance of his teachers in Medicine and Surgery would be tried out, experience in combating disease enriched; and enhanced by blending the doctor's own personal responsibility in doing the best available for his patient. Character and the soul of our profession find their place here.

Many times through the years have I sat with him discussing clinical problems, sometimes in general conversation, sometimes as a consultation. It happened that I was of some assistance to him in his earlier years, when he started developing his undoubted surgical talent; and our contacts here remain among my most cherished recollections. Once a suggested visit with me to Mayo Clinic was eagerly accepted, and during our stay there, and the famous John B. Murphy Clinic, Chicago, he just devoured what he saw and heard. Their surgical teaching and operative techniques made a lasting impression. He took back too an inspiration, and a purpose never to slacken his efforts for further improvement. His attendance during the years at refresher courses and medical societies was ample evidence of this.

Dr. MacKinnon's life and work became interwoven with the development and progress of St. Martha's Hospital, and the opportunities presented for the patient's good and the doctor's higher efficiency. That he took full advantage of the hospital's educational assets was evident by the skill and techniques he displayed through the years both in general practice and in the department of surgery. Until smitten by severe illness in the last three years of his life, he remained the wise, dependable member of St. Martha's Hospital medical staff; and it is not over praise to say that he contributed his full share to the fine reputation and standing of that institution today.

Tributes appearing in the press, where he was best known, showed that in this somewhat perverse world there is still place for him who tries to do his best. In her column in *The Casket*, Eileen Cameron Henry wrote of him as a neighbour in those graceful and understanding terms characteristic of this lady's writings, whether in prose or poetry. For myself, I may but join with the many in mutual sympathy to his bereaved wife, the daughter of the late Sir Joseph Chisholm, and to the sons and daughters of their fine family.

Dr. McKinnon was a man of quiet habits and with a sound philosophy of life. He took good fortune and bad in his stride, refusing to be puffed up by the one, or cast down by the other, "Do the best you can", he said, in reference to a serious case, "and then go home and sleep soundly". Osler could give no better advice. He and I shared the same room during our four years in medical college, from which came a friendship that stood the test of fifty years, and finds me tonight with pen in hand trying, amid a host of thoughts, to tell of him as I knew him in days gone by.

Across the void that lies between us I want to say: "Hello Will! God bless you!"

GEO. H. MURPHY

(Reprinted from *The Nova Scotia Medical Bulletin*, July, 1952.)

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ABSTRACTS *from current literature*

MEDICINE

Cephalic Tetanus.

BAGRATUNI, L.: BRIT. M. J., 1: 461, 1952.

There have been over 200 cases of cephalic tetanus reported during the past 25 years; it develops after injury to the scalp, face, or neck and associated palsies of cranial nerves III, IV, VII, IX-X, XII, singly or in any combination. The condition is invariably associated with some degree of trismus, although general tetanus does not always follow. The pre-antitetanic serum mortality rate was 53 to 80%. The prognosis is bad for general tetanus if spasm appears within 48 hours after injury and good if after this period. Cephalic tetanus is more deadly than other forms and the prognosis is worse the earlier the signs appear. The palsy may last a few days or persist for several months in the absence of other symptoms, facial palsy, with ultimate recovery, is the most persistent; while ptosis persists for shorter periods.

The tetano-spasmin fraction of the tetanus toxin is fatal to man in a dose of 0.5 mgm.; it is absorbed by the lymphatics and carried to the anterior horn cells by the blood. The paralytic phenomena are very much more difficult to explain. Treatment, no matter how mild the initial symptoms, is to regard cephalic tetanus as a potential case of general tetanus and to give antitoxin—100,000 units intravenously and 100,000 units intramuscularly as soon as possible after the appearance of the signs. Spasms may be controlled by adequate sedation with a special nurse and darkened room. The diet should be high in calories and protein, and given by nasal tube if the trismus is severe. If there is tongue-biting a dental wedge of gauze may be inserted through the teeth.

J. A. STEWART-DORRANCE

Changing Concepts of "Xanthomatous Biliary Cirrhosis".

SHAY, H. AND HARRIS, C.: AM. J. M. SC., 223: 286, 1952.

Interest in the association between xanthomata of the skin and liver disease dates back to the 1850's. There have been subsequent observations that in such cases xanthomatous patches in the walls of the bile ducts might sometimes be seen and the correspondence in appearance between these patches and the atheromata of blood vessels and their association with high blood cholesterol levels has been pointed out. The possibility that a primary disorder in fat and cholesterol metabolism with resulting high blood levels might bring about such bile duct wall deposits, blocking biliary flow and causing local infection and impaired hepatic function has been noted and has been advanced in explanation of the cases of biliary cirrhosis without external obstruction.

The present authors are of the opinion that xanthomatous biliary cirrhosis is an hepatic disease existing in two varieties. In the first, as a result of an increased production of cholesterol and of bile salts (to explain the persistent itching), there results hypercholesterolæmia with xanthomata of the skin but not of the bile duct walls. The disease may result from the action of many hepatotoxic agents or be ideopathic in type, the latter being chiefly in females. A second division of biliary cirrhosis consists in those with obstructing lesions of the bile ducts, and in these both skin and biliary wall xanthomata may develop. The presence of the bile duct deposits is explained using the imbibition phenomenon at present popular in accounting for vascular atheromata and considered to result from the combined effects of a high bile cholesterol and high pressure within the bile radicals leading to a seepage under pressure of the lipid material into the tissues of the duct wall.

G. A. COPPING

Splenic Puncture.

CHATTERJEA, J. B., ARRAU, C. M. AND DAMSHEK, W.: BRIT. M. J., 1: 987, 1952.

Splenic puncture has been used by the authors as a routine diagnostic procedure in 43 cases with splenomegaly. The technique is described and the various sites of puncture are cited with the possible complications with each. Contraindications for splenic puncture are: severe hæmorrhagic manifestations; and spleens which are apt to rupture, recent splenomegaly, and infectious mononucleosis. The aspirate is stained with combined Giemsa and Wright stain. Splenic puncture is indispensable in the diagnosis of myeloid metaplasia, in the diagnosis of atypical of cryptic types of aleukæmic leukæmia, and leucosarcoma where the marrow picture may not be completely diagnostic or may be normal. A normal splenogram is presented as well as several descriptive case histories.

J. A. STEWART-DORRANCE

The Treatment of Maternal Obesity.

RICHARDSON, J. S.: LANCET, 1: 525, 1952.

The author reports on 40 women who developed obesity during or after pregnancy and 30 women whose obesity was unrelated to pregnancy. The 40 women who developed obesity after one or more pregnancies bore 82 children, while the 30 controls bore 71. The average number of living children born to the obese was 2.05, and to the controls 2.37; there were more large babies weighing more than 8.5 pounds born to the obese women. The women in both groups had a generalized increase in fat in the places usual for women—over the breasts, the thighs and buttocks, the back of the upper arms, and in a cape over the shoulders. There was no history of excessive lactation; of the 40 women who developed maternal obesity and reared 82 children, 71 were breast-fed, whereas the 30 controls reared 71 children and breast-fed 39, 86.6% as against 54.9%. The women of both groups usually took 1,600 to 2,300 calories daily. The women with maternal obesity had an average carbohydrate/protein/fat ratio of 4.1/1.0/0.9, while in the controls the ratio was 5.2/1.0/1.0. Both groups were placed on a 1,200 calorie reduction diet with amphetamine, 5 mgm., 1 hour before breakfast and noon-day meal. The controls reduced their weight better than the maternal obese. Response was manifested in 3 ways: some showed an initial rapid loss for a few weeks and then slowed to a loss of a few ounces per month; others had a rapid initial loss, followed by a small gain, and then a slow loss; and others had a continued steady fall in weight. Review of the patient's histories showed a maternal obesity in the patient's mother, the patient had a large birth weight, or was over weight at the time of marriage, in these maternal obesity may be anticipated and controlled. If obesity does not develop during the first trimester and the woman plans to breast-feed her child over-eating should not be allowed, as established maternal obesity is difficult to control.

J. A. STEWART DORRANCE

Analysis of the Autopsy Records of 157 Cases of Carcinoma of the Pancreas with Particular Reference to the Incidence of Thromboembolism.

THOMPSON, C. M. AND ROGERS, L. R.: AM. J. M. SC., 223: 469, 1952.

Believing that reliance upon clinical data alone, or upon the findings at laparotomy palpation, or on examining surgical specimens removed at operation, can be misleading when collecting information of statistical value in carcinoma of the pancreas, these authors have restricted their study to the findings in 157 cases of this disease upon which autopsies had been done. They find that the head is the predominant site in the organ but that 21% showed tumour in the body or tail without

involvement of the head. Weight loss was rapid in the clinical course and was sometimes the initiating feature, anorexia amounting to actual rejection of food was common and weakness was a feature. Jaundice and diarrhœa were infrequent first symptoms.

On physical examination a palpable liver was the most frequent of the positive findings, followed closely by jaundice with ascites and a palpable epigastric mass about half as frequent. Abdominal pain, mostly in the upper abdomen, was often aggravated by lying down. It is interesting that practically all patients had developed both abdominal pain and jaundice before death.

Multiple thromboses are remarkably frequent in cases suffering from pancreatic carcinoma and occur both on the arterial and venous sides of the circulation. It is reported as 31 times as frequent in that disease as it is a complication of carcinoma of the stomach. It is suggested that a product of the local tissue necrosis leads to increased adhesiveness in the body's platelets resulting in multiple thromboses. The possibility that the presence of lipase in the blood may be a factor is referred to.

G. A. COPPING

Undiagnosing Coronary Thrombosis.

KURTZ, C. M.: POSTGRAD. MED., 11: 507, 1952.

The signs and symptoms of coronary thrombosis and pulmonary embolism are easily confused, and careful revision of many cases diagnosed as myocardial infarction indicate pulmonary embolism. Angina is very uncommon in pulmonary embolism. Angina of effort indicates the coronary arteries as the source of trouble, absence indicates pulmonary embolism. Chest pain may or may not be present in pulmonary embolism, if so it is usually a very short duration. Distension of the jugular veins is a constant finding in pulmonary embolism and is unusual in myocardial infarction, unless it is accompanied by decompensation. The second pulmonic sound is accentuated and there is a pulmonic systolic murmur in pulmonary embolism, these findings are relatively uncommon in myocardial infarction. Phlebothrombosis may be found on careful examination of the legs, this is uncommon in the initial stages of myocardial infarction, but is common in pulmonary embolism or infarction, Jaundice, rare in myocardial infarction, is common in pulmonary embolism or infarction. Hæmoptysis usually settles a differential diagnosis. The ECG is typical for a myocardial infarction and may be normal in pulmonary embolism, however, the following has been described as typical of pulmonary embolism: prominent S wave in lead I, usually inverted T waves in Leads V_1 and V_2. Evaluation of the patient's history and noting the obvious physical signs will enable one to differentiate between myocardial infarction and pulmonary embolism.

J. A. STEWART DORRANCE

Physiologic Principles of Resuscitation and Oxygen Therapy.

DRINKER, C. K.: POSTGRAD. MED., 11: 471, 1952.

The restoration of breathing and of efficient blood circulation is invariably an emergency procedure. One minute after cessation of breathing, if artificial respiration is given, the chances for survival are excellent; when 5 minutes have elapsed the chances for recovery are small, only 25%. In prolonged asphyxia the best criterion in determining the expectations for eventual complete recovery, if respiration is restored, is the length of period of unconsciousness which the patient has experienced. The oldest means of artificial respiration is mouth-to-mouth insufflation. This has been supplemented with rectal insufflation of tobacco smoke, or rolling the patient on a barrel. Silvester in 1858 introduced his method of emergency resuscitation and it is still in use, although with the patient on his back the tongue may fall back into the larynx. Because of this Schafer in 1903 introduced the prone pressure method, although physiologically it has been shown that this method does not provide sufficient oxygen—only 250 to 300 ml. of air are moved into and from the lungs. In 1932 Nielson in Denmark introduced a new method of artificial resuscitation which is predicted to become the most popular. The patient is in the prone position and the largest excursion of air of any method is created. It is non-tiring to the operator, and may be used by women and children. The restoration of a supply of oxygen is a great necessity to the body, there is no need for pure oxygen as the air contains sufficient oxygen to meet the immediate requirements, however, in chronic asphyxia oxygen therapy is very beneficial.

J. A. STEWART DORRANCE

Ruptured Cervical Intervertebral Discs.

SCHWARTZ, H. G.: POSTGRAD. MED., 11: 501, 1952.

Lateral rupture of the cervical intervertebral discs should be considered in the differential diagnosis in a patient with a history of pain or stiffness of the neck, with radiation of pain to the shoulder, arm, or hand. In some cases the superficial impression may be that of angina pectoris. Differential diagnosis between cervical rib and scalenus anticus syndrome and cervical disc can usually be made on the basis of the point of reference of pain or numbness. In cases of cervical disc rupture, symptoms and signs are usually referable to the sixth and seventh cervical dermatomes, whereas the other conditions usually involve the eighth dermatome. Roentgenograms of the cervical spine frequently show reversal of the normal curve and narrowing of the suspected interspace.

Cervical discs which rupture closer to the midline may produce signs and symptoms of degenerative cord disease, such as amyotrophic lateral sclerosis, or may even cause complete paralysis simulating spinal cord tumour.

Because of the great risk of cord compression, manipulative treatment is hazardous. Conservative therapy, using halter traction and a Thomas collar, is advisable before proceeding with myelography and surgery. The results of surgery are excellent.

J. A. STEWART DORRANCE

OBSTETRICS AND GYNÆCOLOGY

Antepartum Care.

HANLEY, B. J.: POSTGRAD. MED., 11: 62, 1952.

At one time prenatal care consisted of two visits—to diagnose pregnancy and to assist in parturition—this was associated with a correspondingly higher morbidity and mortality rate than at the present time when 12 to 15 visits are desirable—*i.e.*, every four weeks until the 36th week and then weekly thereafter. At the first visit a detailed history is taken, and a physical examination and indicated laboratory tests are made, these records should accompany the patient to the hospital with the commencement of labour. The patient should be asked to see her dentist if she has not done so in the previous three months. Laboratory work consists of red blood cell and white blood cell counts, hæmoglobin, serology, Rh factor, and chest roentgenogram. Detailed enquiries should be made regarding previous pregnancies and blood transfusions. Whenever the fetal heart cannot be detected after the 16th to the 18th week a pelvic examination is indicated to determine the size of the uterus. Vaginal bleeding requires a speculum examination during the early trimesters. Pelvic measurements may be made by roentgenogram examination. Diet should be emphasized both in regard to the mother and fetus—daily minimum of 1 egg, ½ lb. of lean meat, 1 quart of milk, as well as fresh fruit and vegetables, with adequate liquids. Weight gain of more than 20 lb. should be discouraged. Clothing should be fitting, with no constriction, yet giving adequate support to the abdomen and breasts, garters should be shoulder-slung. Low heeled shoes with adequate arch supports are very advisable. The prospective mother should be encouraged to nurse her child

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and should be advised to effleurage and massage the breasts and nipples. Travel and employment may be undertaken when governed by common sense and practicability. Nausea and emesis of the first trimester may be controlled by more or less specific antihistaminics, frequent small feedings and sedation. Aluminum gels control pyrosis or heart burn. Varicose veins may be controlled by full-length elastic stockings or if very severe by high ligation. Usually the mixed flora vaginitides of pregnancy may be controlled by aqueous gentian violet solution, 2%, and mild acid douches.

J. A. STEWART DORRANCE

PÆDIATRICS

Adoption.

BAKWIN, R. M. AND BAKWIN, H.: J. PEDIAT., 40: 130, 1952.

It is estimated that 48,000 children were adopted in the United States in 1948, by people unrelated to the children, while an equal number were adopted by relatives, and there were two and a half times as many adoptions in 1949 and in 1940.

Adoption may be done through independent or social agencies. Social agency adoptions were "good" in 76% while independent agency adoptions were good in only 46% of cases. A good adoption is the placement of a healthy, normally intelligent child in a stable, secure home where a decent upbringing may be expected. Parents adopt a child usually because they are unable to have one of their own; often due to functional or organic sterility. In many cases the woman becomes pregnant after adopting a child. Adoptive parents are older than true parents because they have tried for some years to have a child of their own and then have to wait until a child is available. Interfaith adoptions may give rise to serious problems and should be avoided. Children should be adopted during infancy as there are fewer environmental adjustments and he makes his initial emotional attachments to his adoptive parents. At the age of 3 to 4 years the child may be told of his adoption in the form of a story. He should never be reminded that he is adopted, and he should know that his home is permanent. The child's reaction to being adopted is a reflection of that of his parents, and that should be one of affection and understanding. There may be periods of doubt when the child goes to school, during early adolescence, during late adolescence, and following marriage. Recently agencies have encouraged the adoption of physically handicapped children, this is of remarkable benefit for the child, and has caused startling improvement in some cases.

J. A. STEWART DORRANCE

The Problem of Eczema in Infancy and Childhood.

BRAIN, R. T.: POST.-GRAD. M. J., 28: 165, 1952.

The earliest lesions of eczema in infants and young children are minute, pale pink papulo-vesicles which erupt in small groups, at first in non-inflamed skin. In infants the lesions are usually symmetrical and first arise on the cheeks just in front of the ears. The affected area of skin is aggravated by friction or the application of creams or ointments. The etiology is usually an inherited or acquired hypersensitivity, and sometimes it may be a direct result of offending substances applied directly to the infant's skin—soaps, detergents, perfumes, dusting powders, or oxides of metals in powders. However, there is no definite proved etiological factor so it may be assumed that an infant with eczema simply has a skin reactive to metabolic and environmental factors; nothing can be done other than protecting the skin from all possible external hazards and to control the symptoms while the child is reared. There are many clinical types, the first (facial type) as described, the second (flexural type) is very persistent and occurs on the knees and elbows, the third type is associated with a scruffy scalp and seborrhœic dermatitis. Pyogenic infection is the foremost complication. Treatment is to eliminate foods to which the infant is sensitive, the emotional environment should be quiet and stable and if necessary chloral or barbiturates given to the mother as well as the child. Bathing of the infant should not be discontinued, rather than water, daily saline baths without soap should be used. The skin should not be rubbed during drying, but dabbed with a soft absorbent towel. After the acute phase has been controlled by bland lotions—calamine or liquor proflavine, emollient creams such as zinc oxide, and castor oil with or without coal tar or ichthyol may be applied. Finally zinc paste with 2% salicylic acid or 2% yellow oxide of mercury will control the condition.

J. A. STEWART DORRANCE

Potassium Bromate Poisoning.

KNAPPENBERGER, R. C.: J. PEDIAT., 40: 105, 1952.

This report brings to 10 the number of reported cases of poisoning from the ingestion of potassium bromate by children, since 1947. Potassium bromate is used as a "neutralizing solution" of permanent wave sets. Gastrointestinal upsets develop within a few hours with vomiting and watery diarrhœa. Later decreased renal function occurs with or without oliguria. Bromate with hydrochloric acid produces caustic hydrobromic acid and free bromide in the stomach. The products of hæmolysis and the oxidizing effects of bromate ion damage the renal tubules, the slow and prolonged renal excretion is probably a direct cause of the acute and subacute nephritis. Treatment is; (1) to administer an emetic; (2) sodium thiosulphate solution, 1 teaspoonful in water; (3) demulcent drinks, such as milk, flour and water, or cereal gruel; (4) sodium thiosulphate solution, 1.0% by intravenous drip, 100 to 500 ml. or 10 to 50 ml. of sodium thiosulphate 10% solution intravenously. Gastric washing or the vomitus and the urine should be tested for the presence of bromides, as a fatal outcome is dependent upon the nephrotoxic effect of bromate. Uræmia should be treated as for mercury poisoning. The Toni company have changed their "neutralizing substance" to sodium perborate and hexametaphosphate. These are much less toxic than bromate. Antidotal procedures are the same as above as well as the addition of magnesium sulphate by mouth.

J. A. STEWART DORRANCE

INDUSTRIAL MEDICINE

Vanadium Poisoning from Cleaning Oil-Fired Boilers.

WILLIAMS, N.: BRIT. J. INDUST. MED., 9: 50, 1952.

The vanadium content of crude oil ash varies considerably according to its source; it is 45% in Venezuelian crude oil but only a trace in that found in Wyoming. The proportion contained in fuel oils, however, is higher and a significant amount accumulates in the gas passages of boilers. In this paper the author describes the symptoms and clinical findings in eight men who experienced vanadium intoxication when cleaning oil-fired boilers. He discusses in detail the method of investigation of the original complaint, the preventive measures instituted and the results achieved.

All eight men experienced trouble. The first symptoms usually occurred between half and one hour after starting work; in some cases they were delayed for 12 hours. They consisted of rhinorrhœa, sneezing, watering of the eyes, soreness of the throat and behind the sternum.

After a period of six to 24 hours, secondary symptoms appeared—dry cough, wheezing, severe dyspnœa, lassitude and depression—. A greenish-black coating developed on the tongue; this faded two or three days after contact with petroleum soot had ended. The symptoms which continued while the men were at work became less severe three days after ceasing work. No permanent ill-effects were noticed. Examination of the men included x-ray film of the chest, electrocardiogram and routine examination of the urine for albumin, sugar and blood. These revealed no abnormality.

The main problem was to prevent inhalation of the dust. Tables show the average results obtained from two thermal precipitator samples taken in the superheater, and the analysis of dust from the boilers during cleaning operations. When experimental changes were made in the method of cleaning two of the boilers, there was not a single complaint of symptoms from the workers.

In view of the risk of vanadium intoxication involved in cleaning oil-fired boilers the author suggests that methods of cleaning the boilers should be reviewed and means derived which do not involve exposure to the harmful effects of the petroleum soot. Even intermittent exposures may lead to bronchitis or pneumonia. He indicates the importance of the workers wearing respirators and suggests that these men should be under medical supervision.

Reference is made to previous literature in connection with vanadium poisoning. MARGARET H. WILTON

Correlation of the Occupational and Environmental History with the Clinical Findings.

SCHNEIDER, R. F.: THE MEDICAL BULLETIN (Medicine for Industry) 12: 207, 1952.

That the present day concept of the relationship of disability to occupation gives the industrial physician an opportunity to practice an ideal type of preventive and constructive medicine, is indicated by this article. Health and job guidance in relation to the individual employee's physical and mental capabilities will enable him to adjust to his environment and make him a healthier and more productive employee.

The author traces the slow development of this concept through the last forty years and points out the rôle of various factors and forces which influenced it, such as social legislation, enlightened management, pioneer work of medical directors in industry, pressure of organized labouur groups and, the complexity of present day industry. He shows also how the rôle of the industrial physician has had to change to keep pace. No longer a doctor who only treats injuries resulting from accidents, the industrial physician today must have a good background in clinical medicine and diagnosis; he must also have complete knowledge of the operations throughout his industry, a general knowledge of each operation and a specific knowledge of the known poisonous chemicals and hazardous agents used.

Two examples are cited to demonstrate what can be accomplished when the occupational history of an individual or group is investigated extensively and correlated with the clinical findings. The correlation and detection is relatively easy when known chemicals of established toxicity are being used; unknown compounds present a more difficult problem. Their toxicity can be determined through animal experimentation or through study, over a period of time, of a group of men working with the suspected material. Today, additional help is provided in the form of the consulting industrial hygienist and special toxicological studies.

Reference is made also to the way in which the correlating of the occupational history with the clinical findings, is applied to the office worker and the executive, and to its importance, not only for the employee's health but also in the interest of the company.

MARGARET H. WILTON

THERAPEUTICS

Further Experiments on the Prevention of Motion Sickness.

GLASER, E. M. AND HERVEY, G. R.: LANCET, 1: 490, 1952.

Previous experiments showed that 1 mgm. of hyoscine hydrobromide prevented seasickness in more men than did 25 mgm. of promethazine hydrochloride ("Phenergan"), this same experiment showed that promethazine might be a better preventive for seasickness than other antihistaminics. This present study was designed to show whether larger doses of promethazine would equal or surpass the results with hyoscine or whether combinations of promethazine and hyoscine would be more effective than either drug alone. One hundred and fifty soldiers were subjected to controlled wave motions in rubber boats in a swimming pool. The men were divided into 6 groups and received mixtures of hyoscine, 1 mgm.; promethazine, 35 mgm.; mannitol hexanitrate, 50 mgm.; and lactose (control placebo), singly or in combination. All the substances containing hyoscine were more effective than promethazine, 35 mgm., although it was felt that the best dose of promethazine is 25 mgm. Promethazine, 35 mgm., prevented vomiting and nausea in fewer men than did hyoscine, 1 mgm., or hyoscine, 0.6 mgm., with promethazine, 15 mgm. Hyoscine, 1 mgm., given 5 to 10 minutes before the motion started was still effective, but less so than when given 1¼ hour beforehand. All likely remedies for motion sickness have been investigated and no further improvement may be expected other than accidentally or by a symptomatic study of basic principles. J. A. STEWART DORRANCE

Management of Resistant Non-healing Skin Lesions.

LOWRY, K. E.: POST.-GRAD. MED., 11: 523, 1952.

Chloresium, a water soluble chlorophyll preparation, is effective in promoting growth of healthy granulation tissue, as well as accelerating epithelization. The author presents reports on 3 cases, an unhealed burn of the leg of 15 years' duration, with an ulcer superimposed on the scar; a breaking down of the skin of the leg in a case of elephantiasis; and of an unsuccessful skin graft following a crushing hand injury. In all cases all "available means" had been employed, with no avail. In the burn case adjunctive therapy was local infiltration of a solution of bacitracin and novocaine. This illustrates the co-operation between the two agents.

J. A. STEWART DORRANCE

Human Atherosclerosis and the Diet.

KEYS, A.: CIRCULATION, 5: 115, 1952.

There are abundant data which show that there is a higher incidence of fatal atherosclerosis in obese or overweight people. Necropsy studies indicate a direct relationship between atherosclerotic changes, including the deposition of cholesterol and lipids, and relative fatness of the whole body. In animals, experiments have shown that the relative calorie intake is linked with the development of atherosclerosis. Yet, the disease occurs in many persons who are neither fat nor overweight. There is little evidence that diet has a direct influence on human atherosclerosis. Such evidence as there is suggests, however, that a substantial measure of control of the development of atherosclerosis in man may be achieved by control of calorie intake and of all kinds of fats, with no special attention being paid to the cholesterol intake.

It may be concluded that the following recommendations may be beneficial: (1) avoidance of obesity, with restriction of the body weight to that which is considered the standard weight for height at the age of twenty-five; (2) avoidance of periodic gorging and even temporary excessive calorie intake; (3) restriction of all fats to the point where the total extractable fats in the

diet are not above 25 to 30% of the total calories; (4) disregard of cholesterol intake, except perhaps for a restriction to an intake of less than one gram per week.

B. L. FRANK

Atherosclerosis. A Symposium.

ALLEN, E. V.: CIRCULATION, 5: 98, 1952.

Three participants in this Symposium, Doctors Katz, Keys, and Gofman, were asked three specific questions: (1) Has it been proved that human atherosclerosis results from the ingestion of cholesterol and/or fat? (2) In the light of present knowledge, is it probable that human atherosclerosis is caused by the ingestion of cholesterol and/or fat. (3) Would you recommend that a patient who has clinical evidence of atherosclerosis have his diet sharply restricted in cholesterol and fat?

In answer to the first question, Dr. Katz thought that cholesterol was the offending agent in atherosclerosis. Dr. Keys said that the question should have read: Has it been proved that human atherosclerosis *may* result from the ingestion of cholesterol and/or fat, to which his answer would still be "no". Dr. Gofman pointed to the fact that atherosclerosis is associated with the presence of certain special lipoproteins in the blood; he regarded a derangement in lipid metabolism as the underlying defect in the evolution of atherosclerosis, and he thought it possible that a deficiency of heparin or a heparin-like substance was at the root of this lipoprotein metabolic defect.

In answer to the second question, Dr. Katz said "yes". Dr. Keys subdivided the question as follows: (a) If mankind stopped eating eggs, dairy products, meats and all visible fats, is it probable that all atherosclerosis would disappear? (b) Is it probable that the development of human atherosclerosis is affected by the amount of cholesterol in any ordinary diets? (c) Is it probable that the development of human atherosclerosis is affected by the amount of fats in any ordinary diets? and answer to (a) with "no", but believed that atherosclerosis would become very rare; (b) with "no", except possibly in rare instances; (c) with "yes", but thought that there were probably large individual differences.

Dr. Gofman, in answer to the second question, pointed out that while the lipoprotein derangement which leads to atherosclerosis was probably not caused by dietary factors, it was probable that dietary fat and cholesterol by unfavourably influencing the serum lipoprotein levels contributed to the progression of atherosclerosis in a large fraction of the human population.

Dr. Katz answered the third question with "no", except when a person was overweight, in which case his diet should be reduced so as to approach the ideal weight, or when a patient had two or more attacks of coronary insufficiency or myocardial infarction attributable to coronary atherosclerosis. Dr. Keys recommended a sharp reduction in all dietary fats without paying special attention to the cholesterol content of the diet. Dr. Gofman pointed to the evidence that a large proportion of patients showed improvement in the lipoprotein pattern on dietary restriction of fats and cholesterol.

The importance of atherosclerosis needs no emphasis and in the author's belief this symposium constituted "the most important published work on atherosclerosis in medical history".

B. L. FRANK

Low Cholesterol Diet in the Treatment of Atherosclerosis.

Cornell Conferences on Therapy: AM. J. MED., 12: 357, 1952.

Two opposing views are expressed: (1) That human atherosclerosis is caused by eating a diet rich in cholesterol, and that this form of vascular degeneration is favourably influenced by a cholesterol-free diet; (2) That human atherosclerosis is not brought on by the ingestion of cholesterol, and that cholesterol-free diets offer no promise for the control of the disease.

Points brought out during the conference in support of these opposing views were: that the special diet is salt-poor, contains fat-poor animal proteins and is distasteful; that the total blood cholesterol level has lost its position as an index of atherosclerosis; that new factors are of importance, such as cholesterol-phospholipid ratios, cholesterol in the beta-globulin fraction, and increased cholesterol molecules of specific dimensions as revealed by the analytical ultracentrifuge; that lipotropic factors have been tested but found ineffectual, and detergent agents studied on animals have proved too toxic in humans.

A strong case was made out in favour of a general reduction of food intake with a view to maintaining normal body weight, and it was felt that the practising physician must be armed with the kind of information and attitude concerning the mechanism of atherosclerosis and the place of cholesterol free diets, which will enable him to withstand pressure in such matters for action long before he is prepared for it on the basis of scientifically valid discoveries.

B. L. FRANK

Therapeutic Nutrition.—With Special Reference to Military Situations.

National Academy of Sciences, National Research Council, January, 1951.

Our views on the importance of an adequate intake of vitamin C under conditions of severe stress, such as acute trauma, are becoming more clearly defined. This report of the Committee of Therapeutic Nutrition recommends as much as one to two grams of ascorbic acid daily during the acute stage of stress, and 300 mgm. of ascorbic acid daily thereafter. Four times the recommended allowance for normal people (70-75 mgm. daily in U.S.A.), *i.e.*, 300 mgm. is probably sufficient under conditions of moderate stress. In cases of burns or extensive tissue trauma and long bone fractures, 1,000 mgm. daily should be given during the acute phase, and 300 mgm. daily until convalescence is established. After that, 70 to 100 mgm. daily are recommended.

After severe burns the blood ascorbic acid concentration and the urinary excretion may fall rapidly to almost zero. It has been suggested that in burns and other extensive surface injuries, vitamin C is diverted from the remainder of the body to the injured area. The very low plasma ascorbic acid levels in severe stress situations are not due to pre-existing deficiency (though this must be taken into account), nor to failure of absorption, excretion in the sweat, secretion in exudates, nor storage, but most probably to increased utilization.

Ascorbic acid is not normally stored to any great extent in the tissues other than in the adrenal and pituitary glands. Under stress the adrenal cortex becomes rapidly depleted of its ascorbic acid. The report concludes that for these reasons it is unquestionably desirable to maintain adequate body stores of ascorbic acid at all times.

B. L. FRANK

FORTHCOMING MEETINGS

CANADA

SASKATCHEWAN DIVISION, C.M.A., Annual Meeting, Regina, Saskatchewan, September 30, October 1-3, 1952.

MANITOBA DIVISION, C.M.A., Annual Meeting, Winnipeg, Manitoba, October 7-10, 1952.

UNITED STATES

THE NATIONAL GASTROENTEROLOGICAL ASSOCIATION, 17th Annual Convention, New York City, N.Y. (Dr. Roy Upham, Secretary-General, 1819 Broadway, New York 23, N.Y.) October 20-22, 1952.

CONGRESS OF NEUROLOGICAL SURGEONS, 2nd Annual Meeting, Palmer House, Chicago, Ill. (Dr. Bland W. Cannon, Secretary, Congress of Neurological Surgeons, 1092 Madison Ave., Memphis, Tenn.) November 6-8, 1952.

ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES, 59th Annual Meeting, Statler Hotel, Washington, D.C. (Stuart E. Womeldorph, Executive Secretary, The Association of Military Surgeons of the U.S., Armed Forces Institute of Pathology, Washington 25, D.C.) November 17-19, 1952.

AMERICAN MEDICAL ASSOCIATION, Clinical Session, Denver, Colo. (Dr. George F. Lull, 535 N. Dearborn St., Chicago 10, Ill.) December 2-5, 1952.

THE RADIOLOGICAL SOCIETY OF NORTH AMERICA, 38th Annual Meeting, Hotel Netherland-Plaza, Cincinnati, Ohio (Dr. Donald S. Childs, Secretary-Treasurer, 713 E. Genesee St., Syracuse, 2, N.Y) December 7-12, 1952.

OTHER COUNTRIES

WORLD MEDICAL ASSOCIATION, 6th General Assembly and 3rd Annual Meeting, Medical Editors of the World, Athens, Greece. (Dr. Louis H. Bauer, Secretary-General, 2 East 103rd St., New York 29, N.Y.) October 12-17, 1952.

INTER-AMERICAN CONGRESS OF RADIOLOGY, 4th Congress, Mexico City, Mexico. (Dr. Guillermo Santin, Secretary, Londres 13, Mexico 6, D.F.) November 2-8, 1952.

INTERNATIONAL CONGRESS ON HYDATID DISEASE, Santiago, Chile, (Organizing Committee, P.O. Box 9183, Santiago, Chile) November 21-24, 1952.

NEWS ITEMS

ALBERTA

Dr. Harold Orr, President of the Canadian Medical Association is doing a tour of duty, in keeping with his high office, of the far Eastern Provinces of Canada. Dr. Donald Wilson and Dr. Walter MacKenzie are accompanying him.

Dr. E. D. MacCharles of Medicine Hat is doing postgraduate work in Eastern Canada and the United States.

Dr. Roy Anderson is presenting a paper entitled "The Abdominal Closure—a Clinical Study" at the annual meeting of the Royal College of Surgeons of Canada October 3 and 4.

A meeting of the chiefs of civil defence service of the Alberta cities was held on August 22 in order to coordinate with the provincial body. It was learned that the hospitals of the province are to have their civil defence plans completed by October 31 and that First-Aid stations are to be set up for training by December 31, 1952. The district medical societies are co-operating in the scheme.

The Workmen's Compensation Board Rehabilitation Unit is near completion in Edmonton and will soon be opened for the above purpose. This unit is situated in the southwest area of the city.

Dr. J. Donald Ross of Edmonton was successful in the recent provincial elections and will be heard from the floor in due time we expect. We wish to congratulate Dr. Ross in this success. He will continue his practice in Edmonton.

W. CARLETON WHITESIDE

BRITISH COLUMBIA

Dr. Myron Weaver, Dean of Medicine in the University of B.C., was recently invited by the University of Missouri to accept the position of Dean of the Medical Faculty in that University. After due consideration, Dr. Weaver has decided to refuse the offer, and remain in British Columbia.

The medical profession of B.C., agrees unreservedly with the President of the University of B.C., Dr. Norman A. McKenzie, who says "Naturally we are delighted. Dean Weaver has done an excellent job, and has succeeded in attracting to the University a faculty of outstanding quality." We should like to add that this faculty has a Dean worthy of it.

The polio situation in British Columbia has reached a rather alarming degree of severity in the past few weeks, and is giving the health authorities a good deal of concern. Vancouver itself has had a great many cases, with a considerable number of deaths. Other parts of the Province are also affected—notably the town of Kimberley, which has been hard hit, with deaths amounting to 20 or 25% of the cases reported. Special teams of nurses and doctors have been sent to this area by the Provincial Health Department, on the orders of Dr. G. F. Amyot, Deputy Minister of Health for the Province. The bulbar type of the diseases has been quite common, and has accounted for the high death rate, mostly in adults.

In some areas, schools, swimming pools and so on, have been closed to the public. So far, it has not been thought necessary to do this in Vancouver or Victoria. There have been, undoubtedly, a large number of mild cases of the disease, which have not progressed to paralysis, or reached the hospitals. The latter have been having a very difficult time in securing adequate nursing service to take care of the cases.

The opening of the new buildings of the B.C. Cancer Foundation will take place in Vancouver in October, (6th to 10th), and a very complete program has been arranged by the officials of the Foundation, under the presidency of Dr. G. F. Strong. A Refresher Course has been arranged for medical practitioners, and will include lectures, clinics, and round-table discussions.

The chief speakers will be Sir Stanford Cade, and Professor B. W. Windeyer, both of London, England. Other visiting speakers will be Dr. S. T. Cantril and Dr. Franz Buschke of Seattle, Wash., Dr. O. H. Warwick of the National Institute of Canada; Dr. H. M. Parker of Richland, Wash., and Dr. B. V. LowBeer of the University of California Hospital, San Francisco.

The British Columbia Hospital Insurance Scheme is again very much in the public eye. The new Social Credit Government has some very definite views about its future, and has publicly stated, through the Premier, Hon. W. A. C. Bennett, that it is in favour of abolishing the compulsory features of the scheme. Since the Act governing the plan makes this compulsory collection mandatory, nothing can be done to carry out this suggestion until the Government can obtain the consent of the Legislature, and this is very unlikely, as the Government has not an overall majority in the House, and the other parties are strongly opposed to the removal of the compulsory clauses.

Meantime, the Government has made some changes in the operation of the Act. The co-insurance feature has been changed. Hitherto, the patient on entering the Hospital was required to put up ten days' co-insurance, generally $3.50 a day, though in some hospitals it was somewhat less. There were two points about this: first, if the patient did not stay the full ten days, the unused balance was refunded. Secondly, this was all he could be called on for, for the whole fiscal year, and this included his entire family—no matter how many times the hospitals were used by the family during that year.

The Government has changed this to a straight one dollar a day co-insurance charge, no matter how long the

patient stays in, and no matter how many of the family are involved—each one will pay the dollar a day co-insurance. It is easy to see that in some cases, this will run a family or individual into large expenses for hospital care, and the leader of the Opposition, Hon. Harold Winch, has opposed the change bitterly on this ground, as he also opposes any suggestion that the compulsory clause should be deleted. Logically, he would appear to be perfectly right, and one cannot but feel that there are going to be some cases of hardship, where long stay in the hospital is necessary, or where several members of a family are hospitalized but psychologically, it is apparently a rather popular idea. The hospitals report much greater willingness on the part of incoming patients to pay the dollar a day, added in most cases to the differential between the basic rate, and the extra charge for private and semi-private wards. It is certainly less of an immediate burden, and after all the average days' stay in hospitals here is around ten or eleven days, so that this will be easier on the great majority, or at least apparently easier.

The B.C. Division of the Canadian Medical Association held its first Annual Meeting, since its reorganization, in Victoria, on September 15, and subsequent days, with a very important program dealing with Medical Economics. This Division has accomplished a good deal in the past few months, including the publication of a new Schedule of Fees. This is quite an accomplishment, as the matter has been under discussion, without reaching any finality, for some three years. A new agreement has been reached with the Workmen's Compensation Board, and better terms secured from the B.C. Government with regard to the payment for Social Assistance cases. Membership in the Division is steadily increasing, and has, we understand, reached the 1,000 mark. It is the sincere desire of the Division to make membership in its organization so attractive that 100% of the profession will ultimately join up, and they are certainly doing everything in their power to bring this to pass.

The College of Physicians, through their Council, is doing all it can to assist the Division in this matter, and has steadily reduced its fees to as low a figure as is practicable.

J. H. MACDERMOT

MANITOBA

Dr. W. D. Bowman has been awarded a Nuffield Foundation travelling fellowship in medicine. He will spend the next year studying clinical pædiatrics at the University of Durham under the direction of Prof. Sir James Spence. Dr. Bowman graduated from the University of Manitoba in 1949, was resident physician at the Children's Hospital, Winnipeg, and for the past year has been conducting basic research on bone marrow under a National Research Council Fellowship.

Sister M. Bertha Dorais, superior and administrator of St. Boniface Hospital, will become Manitoba's first Fellow in the American College of Hospital Administrators. She received her award on September 14 at the annual convocation in Philadelphia. During the Red River Flood in 1950 Sister Dorais remained at her post after all the patients were evacuated and won praise from the Army administrator of flood defence.

ROSS MITCHELL

NEW BRUNSWICK

Up to August 27, 113 cases of polio had been reported in New Brunswick. Four deaths have occurred. There has been no public panic chiefly because the chief medical officer of the Department of Health, Dr. J. A. Melanson, has maintained good newspaper publicity on the situation. Dr. Arthur Chaisson was delegated by the Department of Health to personally supervise the cases reported and to advise Hospitals and the public on measures of detection and care of polio cases.

Dr. R. J. Collins reported at a meeting of the governing board of the St. John Tuberculosis Hospital that further progress had been accomplished in arrangements for the surgical cases of chest tuberculosis in the Province. When the new surgical wing at the St. John Hospital is completed patients requiring chest surgery will be admitted for a sufficient period for survey and preparations for operation. This happy prospect is due to the availability of extra beds to support the surgical centre.

Since the beginning of this year 23 new names have been added to the register of the New Brunswick Medical Council.

A. S. KIRKLAND

NOVA SCOTIA

Since his graduation from Dalhousie in 1902 Dr. Daniel Murray has practised medicine in Pictou County, the first few years in the town of Pictou and since then Tatamagouche. There were interruptions; the first world war was one and there were many trips for postgraduate study. Year after year at the Dalhousie Refresher Courses his tall, lean figure was to be seen well before the opening hour, always first at the registration desk. A skilful diagnostician and a faithful practitioner Dr. Dan has served as a bulwark to his fellow countrymen and an inspiration to his younger colleagues.

Recently they met together at Tatamagouche to pay him tribute. Piped into the local high school hall in traditional Scottish style Dr. and Mrs. Murray were followed by a group of nurses who had been associated with him during his practice. Chairman, Dr. C. L. Gass, was in charge of proceedings in the crowded auditorium and an illuminated address was presented by the Rev. George Whidden. There was a purse of money from the people of north Colchester and adjoining areas in Cumberland County presented by Dr. A. M. Creighton and a second purse from a group of nine doctors, natives of Tatamagouche, and presented by Dr. J. A. Langille. Others who had gained their first knowledge of medicine as patients under Dr. Murray and contributed to this purse were: Dr. W. A. Dobson, Vancouver; Dr. C. L. Gass, Tatamagouche; Dr. Allister McLellan, New York; Dr. Fred McLellan, New York; Dr. Henry A. Matheson, British Columbia; Dr. James Byers, Alberta; Dr. Carson Murray, Springhill; and Dr. A. M. Creighton, Tatamagouche. A bouquet was presented to Mrs. Murray and speakers representative of the different sections of the broad territory which Dr. Murray serves paid their verbal tributes. It was the wish of all that Dr. Murray might continue as their medical adviser for many years to come.

The medical staff of the Halifax Infirmary paid tribute to Sister Mary, once operating room nurse and for many years superintendent of that institution. The presentation took the form of a stained glass window in the Infirmary chapel portraying the gospel story of the man who came down from Jerusalem to Jericho and of the good Samaritan who ministered to him. Said Dr. C. S. Morton, presenting Sister Mary with an illuminated address, "My association with the Halifax Infirmary has been for over forty years, but Sister Mary did not arrive upon the scene for some years after that; yet it has of late seemed to me that Halifax Infirmary and Sister Mary were synonymous terms. . . . Everything seemed to gravitate towards her and rotate around her. It was always so quietly done that one did not fully realize at once the wonderful personality which lay behind the perfect workings of this institution. In her quiet manner she seemed to know all that went on in the place, and it was mainly by some wonderful gift that any slight disturbance or unbalance was recognized and corrected. She most assuredly has been the mainspring and governor which have kept everything in correct timing and precision."

ARTHUR L. MURPHY

Canad. M. A. J.
Oct. 1952, vol. 67

ONTARIO

Provincial grants toward construction of two homes for the aged, totalling more than $225,000, have been announced. Sudbury will receive $135,000 as part payment on a provincial contribution of $750,000 toward a $1,200,000 home. Simcoe County will receive $99,000 of a $200,000 provincial grant. A correspondent in the *New Statesman and Nation* says that if it is one thing old people do not like it is being segregated with other old people.

More help for the child who is having difficulty at school through faulty hearing, vision or speech, is available each year through the auxiliary education summer courses for teachers under the Department of Education. This year 242 teachers took the course in Toronto. They came from all over Ontario, from Alberta and Saskatchewan, with three from Bermuda. The teachers are taught the intricacies of the pure-tone audiometer, an instrument to determine the type and range of hearing, also the use of the telebinocular to tell whether vision defects are likely to interfere with children's reading ability.

Teachers do not diagnose, they simply test the child for defects that might interfere with school work. Test for fusion, the ability of both eyes to see the same thing at the same time in the same place is important.

Faulty vision is found in one child out of seven. One boy in seven has some colour vision difficulty. An interesting bit of equipment is the tachistoscope used to find out visual memory of the child, and to increase it by practice.

Speech therapy for correcting stuttering, stammering and substitution of one letter for another, also lip reading for the deaf are parts of the summer school work. Various types of voice recording instruments are used, including the soundscriber, which makes a record of the child's voice and plays it back so that he can hear his own defects.

Miss Edna McCallum, teacher of remedial classes, London, was in charge of the clinic operated in connection with this summer school. To this came children from all parts of the province for testing as to physical difficulties which might interfere with their education.

In addition to hearing, sight and speech therapy the course covers a large amount of craft work. It also gives instruction in hospital and home teaching methods suitable for sanatorium patients.

Dr. Sakshmi Rao, an Indian woman who took her Ph.D. at Toronto has been given a research grant in bacteriology at the Department of Hygiene for a year, after next year she will return to the Punjab as a member of the staff of Ludhiana Women's Christian Medical College.

Dr. John Firstbrook, who was awarded a Starr Medal at Convocation for his work on arteriosclerosis, has been appointed Professor of Physiology at Queen's University.

Dr. William Mosley, director and medical officer of health for the East York-Leaside Health Unit, received a short term fellowship from the Pan American Sanitary Bureau of World Health Organization which enabled him to attend a seminar on mental health and infant development held at Chichester, Sussex. Dr. Mosley is an associate professor in the department of public health at the University of Toronto.

During the first six months of this year 68 children have been killed in traffic accidents in Ontario.

Dr. Olga Milosevic of Yugoslavia, secretary-general of the Red Cross Society in her country, was a delegate to the International Red Cross Congress at Toronto. She had been a medical officer in Tito's Army in the partisan war against German occupation. While in Toronto she visited the Woman's College Hospital where she was particularly interested in the obstetrical department.

A federal grant of $373,000 to the Charles H. Best Institute of the University of Toronto has been announced. The grant will be used to equip a new building with laboratories for research on diabetes, growth hormones, the use of radioactive isotopes, and problems of physiology, histology and nutrition.

The provincial government has announced a grant of $6,000 by the Alcoholism Research Foundation to Queen's University for a survey of the incidence of alcoholism in Ontario. The survey will be conducted by Professor J. M. Blackburn, head of the psychology department. It will be the first survey of the problem in Canada. Estimates of alcoholism here have been based on U.S. figures.

Officers of the College of Physicians and Surgeons of Ontario are: President, Dr. Carl E. Hill; Vice-president, Dr. J. Harris McPhedran; Registrar-treasurer, Dr. Robert T. Noble; Territorial Representatives, Dr. D. S. Wigle, Windsor; Dr. R. S. Murray, Stratford; Dr. Ward Woolner, Ayr; Dr. John Shehan, St. Catharines; Dr. Carl E. Hill, Lansing; Dr. J. F. Sparks, Kingston; Dr. J. F. Argue, Ottawa; Dr. J. C. Gillie, Fort William; Dr. M. H. V. Cameron, and Dr. J. Harris McPhedran, Toronto.

University representatives are: Queen's University, Dr. Malcolm Brown; University of Toronto, Dr. J. A. Dauphinee; University of Western Ontario, Dr. F. S. Brien; University of Ottawa, Dr. A. L. Richard. Homeopathic representative is Dr. R. S. Schnarr, Kitchener.

Dr. C. H. Best received the honorary degree of doctor of laws from Melbourne University during a medical congress at the Australian city.

The president of the Canadian Tuberculosis Association, Dr. C. G. Brink, Toronto was among the speakers of the third Commonwealth and Empire Health and Tuberculosis Conference held in London in July. Delegates from Australia, Fiji, Gold Coast, India, New Zealand, South Africa and Trinidad attended the meeting.

The city of Kingston, with a population of slightly over 30,000, has set a record in respect to tuberculosis mortality in Canada. There has been no death from tuberculosis in that city since August, 1950.

The city of Toronto with a population of 667,487, had a tuberculosis death rate of 13.9 in 1950, or a total of 93 deaths. The number of cases reported in 1950 was 720.

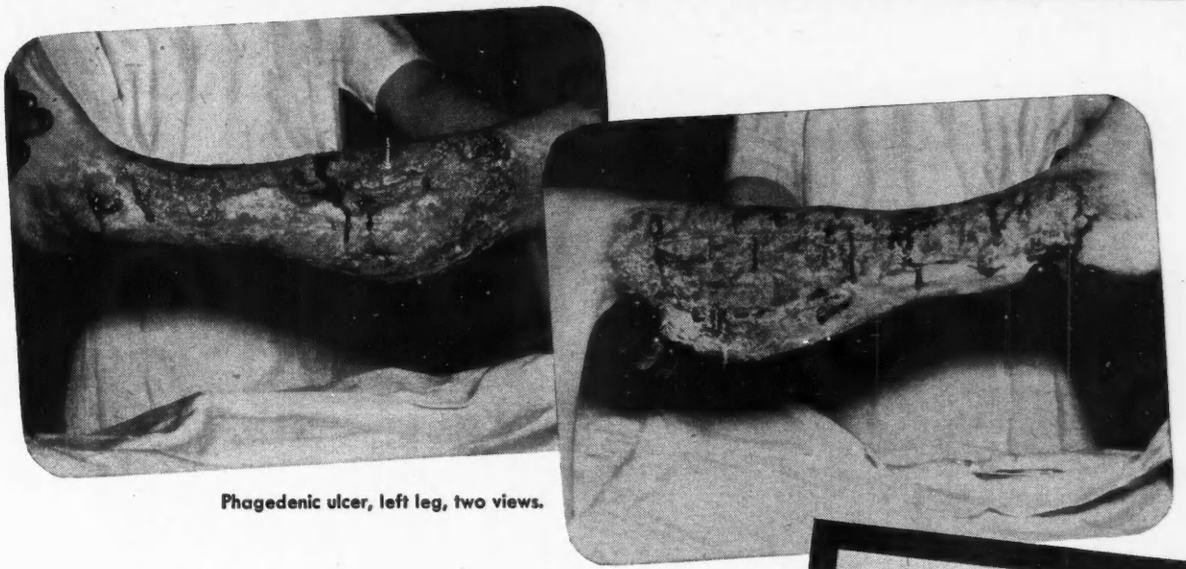
Dr. Allen S. West, Department of Biology, Queen's and Fergus J. O'Rourke, medical entomologist of the Canadian Department of Agriculture have been taking a summer course at Rutgers University's Serological Museum, New Brunswick, New Jersey in the identification of disease carriers by blood examination methods.

LILLIAN A. CHASE

QUEBEC

The fifteenth Louis Gross Memorial Lecture will be delivered on October 16, 1952, by Dr. Charles K. Friedberg, Assistant Clinical Professor, Columbia University, College of Physicians and Surgeons, and Associate Attending Physician, The Mount Sinai Hospital, New York. The Louis Gross Memorial Lecture is delivered annually under the auspices of the Montreal Clinical Society at the Jewish General Hospital, Montreal. The subject of Dr. Friedberg's lecture will be "The Current Status of the Treatment of Coronary Heart Disease".

Dr. Walter deM. Scriver, chairman of the Executive Committee of the Quebec Division of the C. M. A. and member of the Executive Committee of the C. M. A., has



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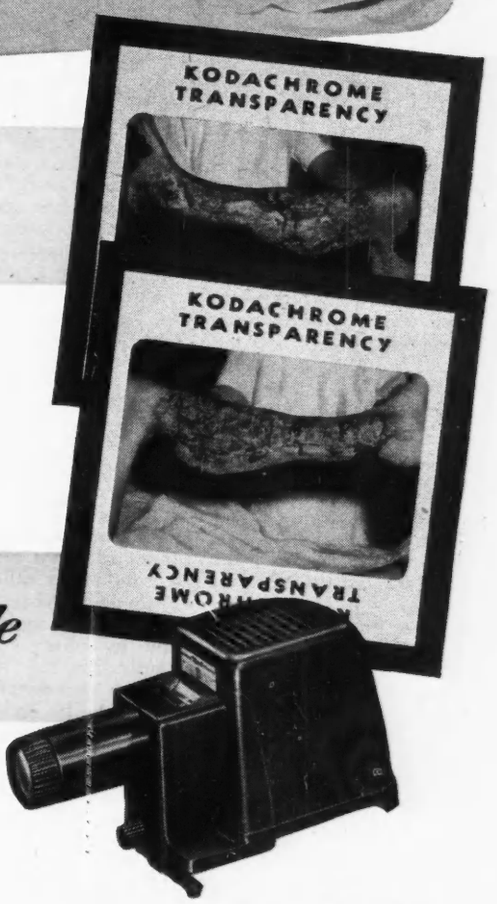

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been appointed physician-in-chief of the Royal Victoria Hospital in Montreal and Professor of Medicine at McGill University. Dr. Scriver was the representative of the C. M. A. at the Commonwealth Medical Conference held in Calcutta, India, this past year.

Dr. G. Raymond Brow, who has resigned from the post of physician-in-chief due to the pressure of other work, will continue as attending physician at the hospital and as professor in the faculty of medicine at McGill. Dr. J. S. L. Browne, director of the University Clinic, R. V. H., is the chairman of the department of medicine.

The Department of Health and Welfare has released the detailed and comprehensive health survey of the Province of Quebec. This report, the result of 2 years' study presents a detailed inventory of health services available in Quebec at the end of 1948, and contains 261 recommendations. In effect, it is a blueprint for future action in the field of health in the province.

Director General of the survey, which was financed by a Federal health grant, was Dr. J. Ernest Sylvestre of the Quebec Department of Health, who was assisted by a general advisory committee and by a number of technical committees which dealt with specific parts of the study.

The report runs 10 volumes and goes into every branch of provincial health service. Throughout the report are recommendations for increased staffs and budgets in government health branches and various health organizations and agencies. Noticeably absent is any recommendation for a national health insurance scheme.

The report recommends setting up of 24 health districts to co-ordinate work of health units and to work out joint programs. It notes that the Province lacks sufficient hospital beds and that hospital facilities are not available in all regions. Other recommendations are: an intensified campaign to detect tuberculosis; financial aid for all important hospitals to enable them to establish or improve cancer diagnostic centres; scientific direction of cancer control to be left entirely to cancer institutes in each of the province's three universities; organization of mobile diagnostic clinics for crippled children to help general practitioners detect cases which might be helped; free mobile mental health clinics to serve general practitioners and rural health units; and many others.

A section of the report recommends that those parts of the Province without a doctor be zoned and that financial aid be made available to county councils who wish, in some manner, to subsidize the doctors and their wives who will settle in such remote areas. It also suggests small hospital units of 8 to 10 beds in remote areas. Extensive study was given to recruiting nurses, and measures recommended to increase the number of girls joining this profession.

SASKATCHEWAN

The annual meeting of the North Eastern District Medical Society was held in Yorkton on Thursday, August 21, 1952, at the Yorkton Hotel. A social half hour preceded a dinner, following which the regular meeting was proceeded with. In the election of officers, Dr. E. J. Kusey of Canora was elected President of the Society, Dr. R. B. Ketcheson of Yorkton, Vice-president, and Dr. H. A. L. Portnuff of Yorkton, Secretary.

The guest speaker was Dean Wendell Macleod of the Faculty of Medicine, University of Saskatchewan, and he spoke about the future plans of the University with regards to medical education and the present status of the new university hospital. According to plans the hospital will be completed in 1954 and ready for occupancy. For the next two years Dean Emeritus Lindsay has been appointed as Secretary and is actively engaged in this work now.

Discussing the proposed teaching, Dr. Macleod outlined his thinking concerning the development of doctors for the family type of practice which, it was stated, was the ideal type of physician needed in many parts of Saskatchewan. As a result it is now considered that in the final year every student in medicine will have ten to twelve weeks of guided rural preceptorship, a form of training which this part of Canada is well suited for. Another trend in today's thinking was emphasized by the Dean and that was the growing and recognized importance of the psycho-social aspects of medicine, and the needs of linking up the subjects taught with the clinical work in a more practical way than has been done at times in the past. Except under unusual circumstances every patient admitted to the new hospital will be available for teaching purposes.

Graduate teaching will also be emphasized in collaboration with the other Western Provinces. Circuit tours of selected teaching teams will in all likelihood be sent to various centres to bring the lecturers and the practitioners together about actual clinical cases.

Following the Dean's remarks, a clinical session was held in which three members of the Society discussed topics of their own choice.

Dr. J. J. Collins of Melville presented a case of "Arrested Labour" as the result of a fetal monstrosity met with in his practice. He ably discussed the history, physical, laboratory and x-ray finding and his management of the patient. Following this he gave a short resume of the literature and the post mortem findings in the fetus.

Dr. B. Schwartz of Theodore, gave a paper on "Rooming in of New Borns in a Small Hospital". In this paper Dr. Schwartz outlined the procedure adopted by the Theodore Union Hospital since November 1948 when the program started. There is a three bed maternity ward kept for this purpose only and provided with drawdrapes for privacy when necessary.

Routinely, new borns are placed in the central nursery for a twelve hour period and then moved in with the mothers who are on an early ambulatory type of treatment. At the present the mothers are being encouraged to nurse their babies and subsequently he stated the self-demand type of feeding is to be initiated. The result so far of 300 deliveries has been good. There have been no skin, respiratory or intestinal infections following the adoption of this program. In conclusion Dr. Schwartz stated that it was his opinion that the babies seemed to be doing well, cried very little and seemed contented, and are in the main up to birth weight on the day of discharge, usually the seventh post partum day. He thinks the system is good and that it saves much valuable nursing time. From the mothers' point of view they are in the main happy, especially the primiparous patients seem to know their babies better when they are ready to leave for home.

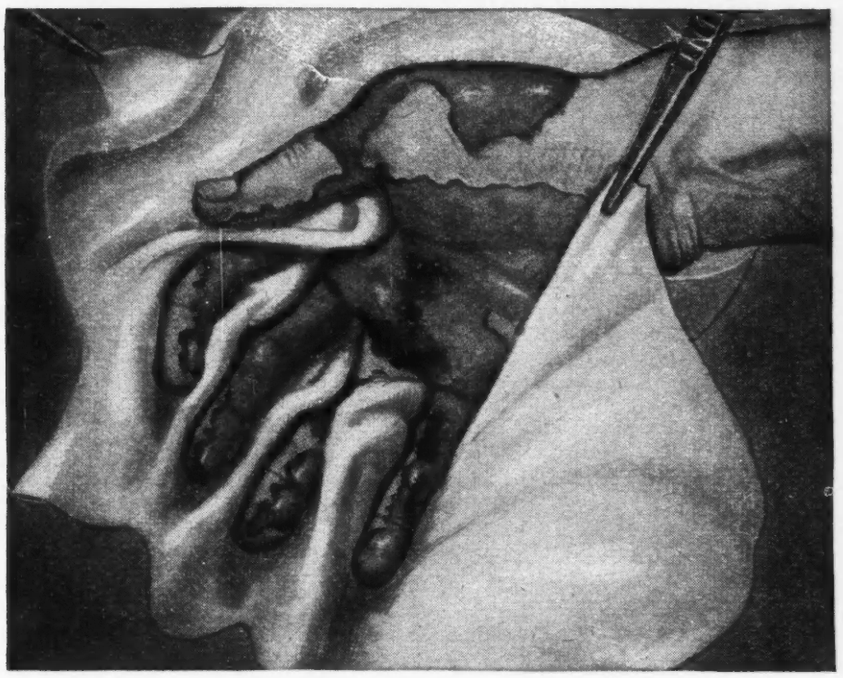
Dr. J. D. Duncan of Norquay presented a very interesting case, fracture of the lower third of the tibia associated with a fracture of the external malleolus of the opposite leg. His presentation and summary involved the question of how these types of injury should be treated. His discussion was very interesting and outlined various complications that can result in actual practice.

The new Rosthern Union Hospital was opened on August 25 with a capacity of 21 beds and related facilities including case room, operating room, examination room, clinical laboratory, x-ray and public health clinic. This hospital serves three municipalities and the villages of Laird, Duck Lake and Hague as well as the Town of Rosthern.

G. W. PEACOCK

NEWS OF THE MEDICAL SERVICES

Retirement of Surgeon Commodore Archie McCallum, O.B.E., V.R.D., C.D., of Ottawa and Toronto, the Royal Canadian Navy's first Medical Director General, has been announced. Commodore McCallum goes on retirement leave on September 15 to be succeeded on that date as Medical Director General by Surgeon Captain Eric H. Lee, of Saskatoon, at present Command Medical Officer, East Coast, stationed at Halifax.



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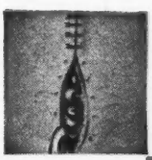

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Nine other appointments affecting senior medical officers of the Royal Canadian Navy were announced at the same time.

Surgeon Commander T. Blair McLean, of Edmonton, who has been undergoing a course at the U.S. Naval Hospital, San Diego, California, for the past year, becomes Deputy Medical General. Prior to the second world war he served in the R.C.N.V.R. on the lower deck. As a qualified medical man he was promoted surgeon-lieutenant shortly after hostilities commenced. He succeeds Surgeon Commander W. J. Elliot, of Ottawa, who was appointed in July to a course at the U.S. Naval Hospital, Philadelphia.

Surgeon Commander F. G. W. MacHattie, of Toronto, becomes Command Medical Officer on the staff of the Flag Officer, Atlantic Coast, as successor to Surgeon Captain Lee.

Another Toronto doctor, Surgeon Commander R. A. G. Lane, who has been serving temporarily as Deputy Medical Director General, left on August 29 for a course at the University of Pennsylvania.

Surgeon Commander J. W. Rogers, of Port Sandfield, Ontario, who has been serving in *H.M.C.S. Ontario* (cruiser), has been appointed to the R.C.N. Hospital at Esquimalt, B.C., and will also serve as staff officer (hygiene) on the staff of the Command Medical Officer.

At present in *H.M.C.S. Magnificent,* (aircraft carrier), Surgeon Commander R. H. Roberts, of Liverpool, England, will attend a medical conference in the United Kingdom before taking up the appointments of Principal Medical Officer of *H.M.C.S. Stadacona,* and of the R.C.N. Hospital at Halifax.

Surgeon-Lieutenant-Commander J. H. Fleming, of Toronto, who has been serving at Halifax, has been named Principal Medical Officer of the *Ontario.*

Appointed Principal Medical Officer of the *Magnificent* is Surgeon-Lieutenant-Commander R. F. Hand, of Halifax.

Air Commodore A. A. G. Corbet, Director of Medical Services (Air) recently made a tour of R.C.A.F. units in Western Canada.

Group Captain J. A. Mahoney, former Deputy Director of Medical Services (Air) is proceeding to New York City to attend a postgraduate course in Hospital Administration at Columbia University. Squadron Leader W. J. S. Kettles, a recent graduate from the Para-Rescue course at R.C.A.F. Station, Edmonton, Alta. is also proceeding to New York City to take a postgraduate course in Hospital Administration at Columbia University.

Wing Commander D. G. M. Nelson, Staff Officer Medical Services, Air Transport Command, Lachine, Que. has recently reported to Air Force Headquarters to assume the position of Deputy Director in Charge of Medical Administration.

Wing Commander G. D. Caldbick, who has been attending a postgraduate course at Harvard University, Cambridge, Mass., will report to Air Force Headquarters to assume the duties of Deputy Director in Charge of Professional Services.

Major J. L. Johnston and Captain S. M. Mazewski have been posted to the Far East as replacement medical officers.

The following United Kingdom physicians were recently appointed to commissions in the Canadian Army Active Force: Captains J. J. Curtin, J. K. Edwards, B. F. T. Liddy, J. R. McIver, G. Neilson.

Lieut.-Col. A. L. Kerr formerly Area Medical Officer, Eastern Quebec Area, has been appointed Commandant, The R.C.A.M.C. School, Camp Borden, Ont. Major U. Blier, Quebec Military Hospital, has replaced Lieut.-Col. Kerr as Area Medical Officer.

Lieut.-Col. B. L. P. Brosseau, M.C., R.C.A.M.C., has been appointed an officer of the Order of the British Empire for his services in Korea as Commanding Officer, 25 Canadian Field Ambulance.

Major J. K. Besley, R.C.A.M.C., has been mentioned-in-Despatches for his services in Korea as a Regimental Medical Officer.

GENERAL NEWS

[The Editor will be glad to consider any items of medical news or of lighter material that may be sent in for this column.]

THE TENTH INTERNATIONAL CONGRESS OF DERMATOLOGY

The Tenth International Congress of Dermatology was held at Bedford College, Regent's Park, in London, on July 21 to 26, 1952, under the patronage of Her Majesty, the Queen. The Congress was officially opened by His Royal Highness, The Duke of Gloucester, K.G., at Friends House, Euston Road. Seventeen years had elapsed since the last International Congress was held in Budapest, and New York was to have been the place of meeting in 1940. This five year schedule was interrupted by World War II.

Sir Archibald Gray, C.B.E., M.D., F.R.C.P., F.R.C.S., London, and the British group, initiated the revival of these international gatherings, and the American and Continental dermatologists graciously agreed to hold this session in London in order to overcome European currency travel restrictions. Registration exceeded 1,100 members with the associates, while over 850 delegates from 40 different countries attended the sessions. The largest delegation came from the United States, some 200 in all. From far-off Australia eight members attended, while Canada was represented by twelve delegates. The governments of the United States and of Australia, realizing the educational value of these international meetings, allow deduction of travel expenses from income tax for their country's representatives. This may explain, in part, the large number attending from the United States. It is hoped that the Canadian Government, with its progressive outlook in medical matters, will soon consider such income tax deductions to encourage the attendance of Canadian physicians at international meetings.

To G. B. Mitchell-Heggs goes the credit for carrying the heavy duties of the Secretary General's office. His outstanding ability displayed in organizing other international medical congresses made him the logical choice for this important post. R. M. B. MacKenna, in the post of Academic Secretary, performed the Herculean task of selecting and later directing the presentation of scientific papers contributed by members from the forty countries. He and his committee arranged for three main discussions before the Congress: (1) The Pathogenesis of Eczema; (2) ACTH and Cortisone: Effects on the Skin and Skin Diseases; (3) The Treatment of Tuberculosis of the Skin and Allied Conditions. In addition, 180 papers were presented dealing with recent advances and newer methods of therapy developed in dermatology.

During the main sessions simultaneous transmission of the speeches was made available by means of earphones in five different languages: English, German, French, Italian and Spanish. This innovation, as employed in the UN, made it possible for all members to follow the matters under discussion. F. Ray Bettley of London, editorial secretary, and R. D. G. Ph. Simons of Amsterdam, have jointly edited, and will shortly publish, the abstracts and proceedings of the Congress in the *Excerpta Medica.*

An excellent scientific and historical exhibit was arranged for and displayed by the committee under the chairmanship of M. Sydney Thomson. Great credit is due to G. A. Hodgson, who gathered together com-

(Continued on page 72 of the advertising section)

Canad. M. A. J.
Oct. 1952, vol. 67

BOOK REVIEWS

LIVER INJURY

Transactions of the Tenth Conference, May 21-22, 1951. F. W. Hoffbauer, Department of Medicine, University of Minnesota Medical School, Minneapolis, Minn. 320 pp., illust. $3.75. Josiah Macy, Jr. Foundation, New York, 1951.

Interest in the liver as a focal point of many metabolic processes has recently gained in importance still further with the recognition of the additional part which it plays in balancing groups of substances in the body, which at first sight do not appear to be immediately related to the liver, such as hormones and vitamins. The Transactions of the Tenth Conference of Liver Injury, now available in book form, offer a fund of information. A large part of the discussion is devoted to the action of lipotropic factors in animals and in man, a subject which is of great general interest at present. Another topic dealt with at some length, is the effect of insulin on the liver with contributions by some of the best-known workers in this field. The book can be recommended to all those interested in metabolism.

RUPTURES OF THE ROTATOR CUFF

H. F. Moseley, Hunterian Professor, Royal College of Surgeons of England. 90 pp., illust. $7.75. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1952.

This small monograph is distinguished by its clear, concise and instructive text and the high quality of its illustrations. It records the knowledge accumulated by Dr. Moseley over a long period of assiduous study of the shoulder joint problems, especially rupture of the supraspinatus tendon.

As the title indicates, the text limits itself to a single problem; one that is probably the most frequent and most disabling of all shoulder joint lesions. It would have been valuable to have included some reference to other related shoulder joint problems, especially the "frozen shoulder" which may develop from ruptures of the rotator cuff as well as from other primary lesions. But this is a minor criticism.

All sections of this monograph are good, but that on diagnosis, entitled The Clinical Picture, is particularly valuable since it presents the picture of the lesion in its early stage with clarity and precision. It should materially assist practitioners who first see these injuries to recognize them at a moment when most can be accomplished by active surgical treatment. Dr. Moseley rightly emphasizes the importance of early recognition of tears of the rotator cuff since repair to be effective must be carried out within a week or two of the injury. Late repair usually ends in a disappointing result.

It is a pleasure to pay tribute to a surgical monograph of Canadian authorship, the outcome of clinical investigation carried out in Canada.

CLINICAL LABORATORY DIAGNOSIS

S. A. Levinson, Director of Laboratories, University of Illinois Research and Educational Hospitals, Chicago, Illinois; and R. P. MacFate, Chief, Bureau of Laboratories, Department of Health, City of Chicago; Assistant Professor of Pathology, University of Illinois College of Medicine, Chicago, Illinois. 1146 pp., illust., 4th ed. $15.50. Lea & Febiger, Philadelphia; The Macmillan Company of Canada Limited, Toronto, 1951.

This is the fourth edition of this book on laboratory procedures which has since its first publication in 1937 enjoyed great popularity among laboratory workers. It covers a wide field including metabolism, chemistry, hæmatology, bacteriology, skin tests, tropical diseases, milk and water analyses, histologic techniques, and legal medicine and toxicology. In addition to detailing procedures, the authors include the principle of each test, interpretation of results and pertinent clinical considerations.

The section on chemistry includes an adequate description of visual and photoelectric colorimetry. The insulin test has been added under gastric analysis, and the galactose tolerance tests under metabolism. Additions to the section on hæmatology include methods for eosinophil counts, the heparin-protamine titration procedures, tests for paroxysmal hæmoglobinuria, and others. The paragraphs on the Rh factor have been rewritten and include the Coomb's test. In the section on bacteriology there are additions on antibiotic sensitivity and assay tests. Techniques used in mycology are also included. The section on serology is as adequate as the rest of the book, but no reference is made to the techniques utilizing the cardiolipin antigen. Skin tests for chancroid, coccidiomycosis, glanders, histoplasmosis, trichinosis, tularæmia and mumps have been added.

This book is definitely recommended for those interested in clinical laboratory sciences. It tells the laboratory worker how to carry out diagnostic procedures and helps the clinician in evaluating and interpreting the laboratory results.

A SHORT TEXTBOOK OF MIDWIFERY

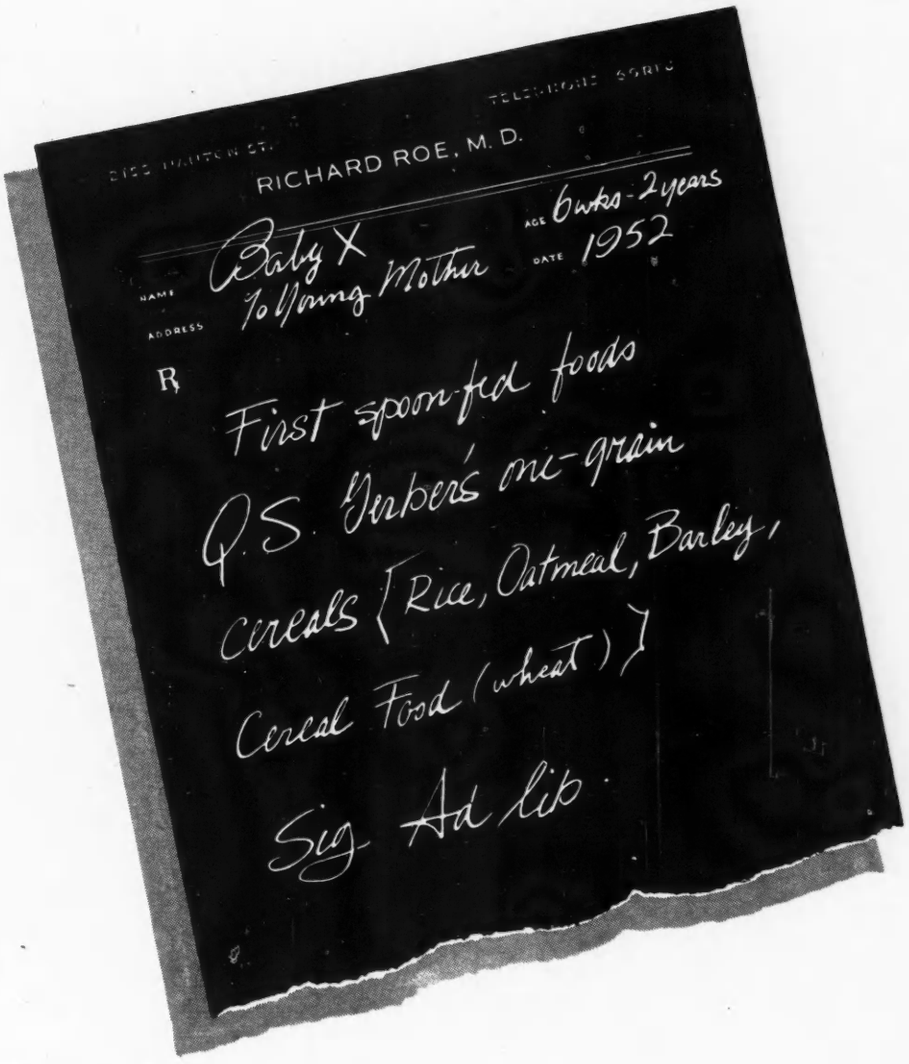
G. F. Gibberd, Obstetric Surgeon, Guy's Hospital; Senior Obstetric Surgeon to In-Patients, Queen Charlotte's Maternity Hospital. 576 pp. Illust. 5th ed. $5.00. J. & A. Churchill Ltd.; British Book Service (Canada) Ltd., Toronto, 1951.

This well known textbook of midwifery has rightly deserved its popularity among medical students in many countries. The illustrations, line drawings, x-ray and other photographs, diagrams and charts, are helpful visual aids in comprehending and remembering the printed word. Mr. Gibberd has in this edition recast completely the account of a number of problems, reflecting some of the changes in outlook which have occurred gradually over the past few years. He has rewritten the sections on placenta prævia, and the management of phthisis and pregnancy. Physical exercises in ante-natal care, omitted in previous editions, have found a place in the index. The account of puerperal infections is still rather lengthy and the author justifies the length of the chapter by explaining that such infections offer a rich field in which to study the general features of bacterial invasion of tissues, useful for the understanding of any branch of clinical medicine. He agrees that cases of severe sepsis are very rarely encountered under modern conditions of early and effective treatment, but he feels that a knowledge of the natural history of the variouus types of pyogenic infection will enable the student to select the best type of treatment in any given case.

The discussion of the etiology of, and the pathological changes occurring in, hyperemesis gravidarum is somewhat hypothetical and lengthy for a "short textbook" for students. Discussing the treatment of post-partum hæmorrhage, the author holds that "it is difficult to understand how the use of human plasma as a fluid for restoring blood-volume ever came to be tolerated by clinicians when so satisfactory and safe a fluid as gum-saline had stood the test of time for twenty years before plasma was introduced", a view with which not everyone will agree today.

This volume, as its previous editions, may be warmly recommended to medical students preparing for their examinations in midwifery and to interns, who wish to refresh their memory on some fundamental points in obstetrics.

The Horner Manual (Aids to Diagnosis) is now in its second edition. It is convenient in size and contains a considerable volume of well arranged material. Copies will be sent free on request to Messrs. Frank W. Horner Ltd., 950 St. Urbain St., Montreal 1, Quebec.



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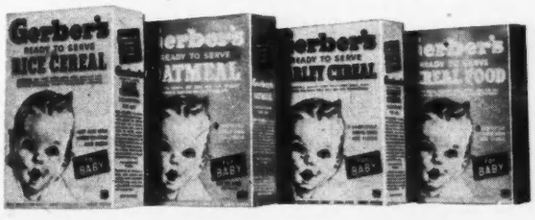

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(Continued from page 392)

mercial exhibitors for the technical exhibition. Lord Gorell officially opened this section of the Congress.

The outstanding event of the Congress was the display of clinical cases at the Queen Alexandra Military Hospital, Millbank. G. B. Dowling, as chairman of the Clinical Case Sub-Committee, amassed, with his confrères, a most outstanding group of rare and unusual dermatoses. The two groups were shown on successive afternoons, and represented a collection of 170 cases in all. It was the unanimous opinion of the members of the Congress that they had never before viewed and examined such an excellent display of dermatological clinical cases. The completeness of the work-up and the meticulous care used in the preparation of these presentations testified to the thoroughness and soundness of the British dermatologists.

Sir Archibald Gray, as President of the Congress and of the British Executive Committee, accorded to Australia and to Canada, along with the principal nations, Honorary Vice-Presidencies to representatives from these countries. The Executive Committee further honoured with chairmanships of sections of the Congress Drs. D. E. H. Cleveland, B. Usher, E. Gaumond and L. P. Ereaux. Papers delivered before the Congress by Canadians were: Dr. Emile Gaumond, Clinical Film on Xeroderma Pigmentosum; Dr. F. Kalz, Studies of Plasma Changes in Skin Diseases by Paper Chromatography; Dr. Donald S. Mitchell, Wool Dermatitis: Dr. L. P. Ereaux, Opener of main discussions on ACTH and Cortisone: Effects on the Skin and Skin Diseases.

The following Canadian delegates were present at the Congress: a group from French Canada including Drs. Maurice Beaudry, Emile Gaumond, Eugene Garceau, Paul Poirier and Henri Smith; and Drs. D. E. H. Cleveland, L. P. Ereaux, A. Freedman, F. Kalz, D. Mitchell, P. Schopflocher and B. Usher.

It is impossible to adequately record the kindliness and hospitality extended to the members of the Congress by our English hosts and hostesses, and only the barest mention can be made of all the entertainment provided. The President of the British Association of Dermatology and Mrs. J. E. M. Wigley entertained members of the Congress at The English Speaking Union, Dartmouth House, and this was followed by a reception at the Guildhall by the Lord Mayor and Lady Mayoress of London, Sir Leslie and Lady Boyce. Her Majesty's Government held a reception at Lancaster House, St. James's, where the guests were received by Miss Patricia Hornsby-Smith, M.P., Parliamentary Secretary to the Ministry of Health.

The Vice-Chancellor of the University of London held a reception in honour of the members of the Tenth International Congress of Dermatology at the Senate House. The President of the Tenth International Congress of Dermatology and Lady Gray received at the University College Hospital Medical School. Sir Archibald and Lady Gray entertained at dinner at the Royal Zoological Garden and had a tea in the beautiful setting of Regent's Park on the closing day of the Congress. Sir Russell Brain extended the hospitality of the Royal College of Physicians to the visitors in England and, at the Dinner held in Grosvenor House, the members were privileged to hear the address on "The Future of Dermatology" by Sir Henry H. Dale, O.M., C.B.E., M.D., F.R.C.P., F.R.S.

These official receptions represent but a small portion of the warmth of hospitality extended to their guests by our gracious British hosts, who arranged many private dinner parties and entertainments for their visitors. It would be remiss not to acknowledge with grateful thanks the work of the Ladies' Committee, under the Presidency of Lady Gray, the Chairmanship of Mrs. J. E. M. Wigley, and the Honorary Secretary, Mrs. W. J. O'Donovan, who organized and staffed the Registration Booths, arranged the sight-seeing trips, and who did a thousand-and-one tasks to make the Congress a happy and pleasant one for the wives and attending delegates.

It was arranged that the Eleventh International Congress of Dermatology will be held in Stockholm under the Presidency of Prof. G. Miescher of Zurich with Prof. Sven Hellerstrom of Stockholm as the appointed Secretary-General.

It was felt by all of us who attended this Congress that the greatest benefits derived were those arising from the meeting of distinguished teachers and confrères and from the exchange of ideas. This friendship goes far to develop international understanding and to further the advancement of medicine.

L. P. EREAUX

ALVARENGA PRIZE, 1952

On July 14, 1952, the College of Physicians of Philadelphia awarded the Alvarenga Prize for 1952 to Norbert Wiener, Ph.D., Professor of Mathematics, Massachusetts Institute of Technology, for his contribution to the field of cybernetics.

FIRST ANALYSIS OF U.K. HOSPITAL ACCOUNTS

The first detailed costing returns for hospitals in the National Health Service in England and Wales was published recently by the Ministry of Health. They are for the year ended March 31, 1951, and cover some 2,750 hospitals. A relatively simple system of cost analysis, based on the headings of the financial accounts, has been introduced and forms the basis of the present returns. This system was recommended in a report by a committee appointed by the Treasurers of Regional Hospital Boards and adopted by the Minister after consultation with the financial officers of Boards of Governors. It was felt that such a scheme could be operated satisfactorily throughout the hospital service and, as a beginning, would provide a reasonable measure of cost accounting.

"Hospital Costing Returns, year ended March 31, 1951" may be obtained shortly from the United Kingdom Information Office, 275 Albert Street, Ottawa, at $2.25 postpaid.

CO-OPERATIVE RHEUMATIC FEVER STUDY

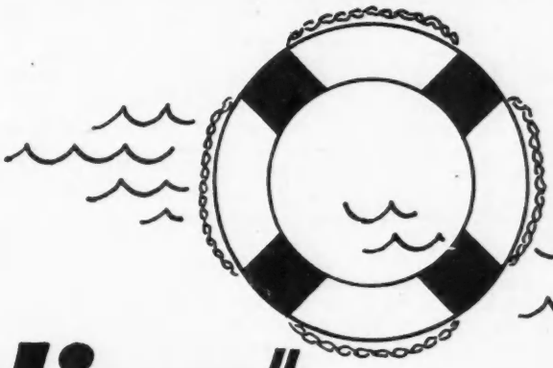
Early in 1951 an international study of the treatment of rheumatic fever was set up with the object of measuring the relative values of ACTH, cortisone, and aspirin. This co-operative study, first of its kind in this field, is being conducted in 13 research centres in the United States, Great Britain, and Canada by the American Heart Association's Council on Rheumatic Fever in conjunction with the British Medical Research Council.

A preliminary report of the findings was made by a Panel of investigators in Chicago on June 7, 1952. A summary statement, which follows, was presented by the Moderator for the Panel, Dr. David D. Rutstein, Boston, Chairman of the Committee on Criteria and Standards of the Council on Rheumatic Fever.

"The plan of study provides for uniform criteria for the diagnosis of rheumatic fever and for the degree of rheumatic activity required for the admission to the study, the random allocation of patients to the three treatment groups, a defined dosage schedule of the drugs for a fixed period of time, a specified period of observation following treatment and a long term follow up schedule. It also lays down precisely the frequency and type of clinical and laboratory observations to be carried out on each patient.

"To date, in all three countries, 658 cases have been admitted to the study and the analysis of rather less than half of these is the basis of the preliminary report. In the type of cases admitted to the trial and with the regimen of treatment laid down, it appears that individual symptoms, signs or laboratory observations may

(Continued on page 74 of the advertising section)



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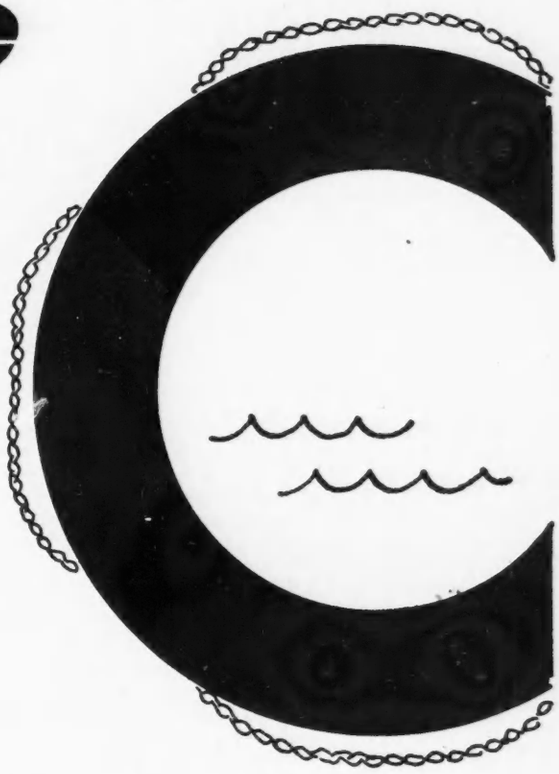

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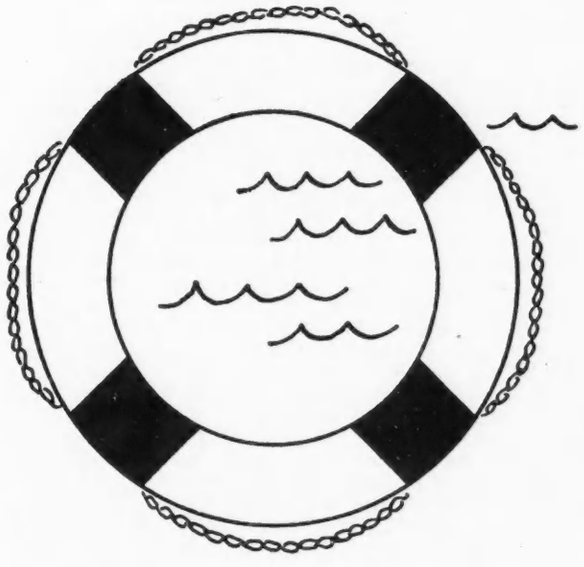

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In bottles of 100 and 500.

"SULFADINE" SUSPENSION, No. 3855

Each 5 cc. (teaspoonful) contains 0.5 Gm. Sulphadimidine B.P.C. in an unusually palatable raspberry-flavored base. In 4 and 16 ounce bottles.

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have been affected more favourably by one or another of these three drugs, but no consistent pattern is evident. In short, no firm conclusions can at present be drawn concerning the drug most effective in the control of the acute illness. The cases have not been under observation sufficiently long to provide data on the prevention of rheumatic heart disease.

"Admission of new cases to the study will be brought to an end later this year. It is anticipated that a total of 750 cases will be available in all three countries for complete and detailed analysis of the effects of the drugs on the acute course of the disease and later, after adequate follow up, on the prevention of rheumatic heart disease."

The Canadian investigator who participated in the Panel was Dr. John D. Keith, Hospital for Sick Children, Toronto.

SALE OR IMPORT OF ISONIAZID

The Department of National Health and Welfare advises that drug manufacturers, sanatoria and qualified investigators working in sanatoria are the only ones who may buy or import into Canada the recently-discovered drug for tuberculosis, isoniazid or isonicotinyl hydrazide. This drug is marketed under a variety of trade names. Officers and consultants of the department are not yet satisfied as to the safety of this drug in the treatment of tuberculosis, and have placed these restrictions on its purchase or import lest it be used indiscriminately with harmful effects.

Reports of its usefulness have been cautiously optimistic, pending further clinical trials to determine whether or not its effects are lasting, whether the tubercle bacillus develops resistance to it and whether it has any dangerous side effects.

The federal regulations prescribe that shipments of this drug in its finished form must be clearly labelled to show that they are for experimental use by qualified investigators only, and manufacturers and distributors must maintain records of distribution.

WHO REGIONAL MEETINGS

The first meeting of the World Health Organization's Regional Committee for Africa to be held in Africa has opened in Monrovia, Liberia, under the chairmanship of Dr. J. N. Togba, the country's Director of Public Health. Delegates from eight member states were welcomed by Liberia's President, William V. S. Tubman, who noted that this was the first time an international conference of any kind had been held in the country. President Tubman noted the presence of Dr. Brook Chisholm, Director-General of WHO; Dr. Francois Daubenton, Regional Director of the WHO Office for Africa; and Dr. Arne Barkhuus, special representative of the Secretary-General of the United Nations.

The WHO's Africa regional office will soon be set up in Brazzaville. Its staff will work in co-operation not only with governments but also with the peoples of Africa.

A Western Pacific Seminar on vital and health statistics was held in Tokyo, Japan, from August 4 to September 20 under the auspices of the U.N., WHO's Regional Office for the Western Pacific, and the Government of Japan. There were more than 30 participants from Western Pacific countries and territories including: Australia, the Republic of China, Hong Kong, Japan, the Republic of Korea, the Philippines and Singapore. The working language was English, with translation into Japanese.

The seminar was the first on health statistics to be held in the Western Pacific and the third of its kind to be held anywhere. Its objective was to improve national statistics services so that their data may fulfil both national and international needs. WHO expected the seminar to result in an important advancement in co-operative health work. Recognition of the need for integrated and accurate action has made the hitherto "backroom" science of compilation and assessment of such statistics an essential foundation for health planning.

PSYCHOLOGICAL PROBLEMS OF CEREBRAL PALSY

The National Society for Crippled Children and Adults, the Easter Seal Society, has just published a booklet by the above-named title. The proceedings of the first symposium ever held to consider exclusively the psychological aspects of cerebral palsy, the booklet brings together the important papers of outstanding psychologists, presented at that meeting. More than 500 of the nation's leading psychologists attended the symposium held in Chicago under the joint sponsorship of the Division of School Psychologists of the American Psychological Association and the National Society.

Distinguished specialists on the psychological problems of cerebral palsied children and adults examine such important factors as psychological evaluation, education and vocational planning and group counseling with parents of cerebral palsied children. Newest finding of recent research studies in the field are also highlighted.

Contents of the book include papers on anatomical facts related to spasticity, psychological appraisal of children with cerebral palsy, group counseling with parents of the cerebral palsied, distinction between cerebral palsy and neurophenia, educational and vocational planning for the cerebral palsied child. Copies of "Psychological Problems of Cerebral Palsy" can be purchased at $1.25 apiece from the National Society for Crippled Children and Adults, 11 South La Salle Street, Chicago 3, Illinois.

INTERNATIONAL RABIES CONFERENCE

Important advances in methods of diagnosing, treating and controlling rabies are likely to be introduced in a number of countries as a direct result of new knowledge gained by rabies workers of 23 different nationalities attending the International Rabies Conference which has just terminated its two-week session in Coonoor, S. India. The Conference was organized by WHO with the help of the officers and staff of the Pasteur Institute of Southern India, Coonoor. The Government of India acted as host to the Conference which brought together 50 rabies workers, largely from Asian countries.

This conference was devoted mainly to lectures and practical laboratory teaching given personally by some of the world's leading authorities on rabies and covering recent advances in laboratory methods of rabies diagnosis, the production of serum and vaccines, and field work in rabies control including mass vaccination of dogs.

The experts examined certain evidence indicating that the injection of a specially-prepared serum in addition to the usual vaccination procedures was more effective in preventing rabies than the vaccinations alone. During the Conference plans were made for a series of trials of this serum to be carried out during the ensuing year in various parts of the world, so that the results may be presented to the WHO Expert Committee on Rabies at its second meeting to be held in Rome in September, 1953. Another important question discussed by the experts was the use in rabies-control programs of a newly-developed anti-rabies vaccine for the mass vaccination of dogs. According to evidence now available, this new vaccine, obtained by cultivating the virus in chicken eggs, seems likely to give longer immunity against rabies than the usual vaccine.

The Coonoor Conference was unique among similar scientific gatherings for the detailed and intensive laboratory training given to a large international group who were able actually to work individually at the laboratory benches in order to learn and to practice difficult and complicated new laboratory procedures. Another advantage of the detailed practical training obtained by participants was that standardized techniques will tend to be used in the different laboratories throughout the world doing rabies work, and the results obtained will be more easily comparable, thus improving the knowledge of world medical science concerning this terrible disease.